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# An Annotated Bibliography of the Dark-sided Cutworm

## *Euxoa messoria* (Harris)

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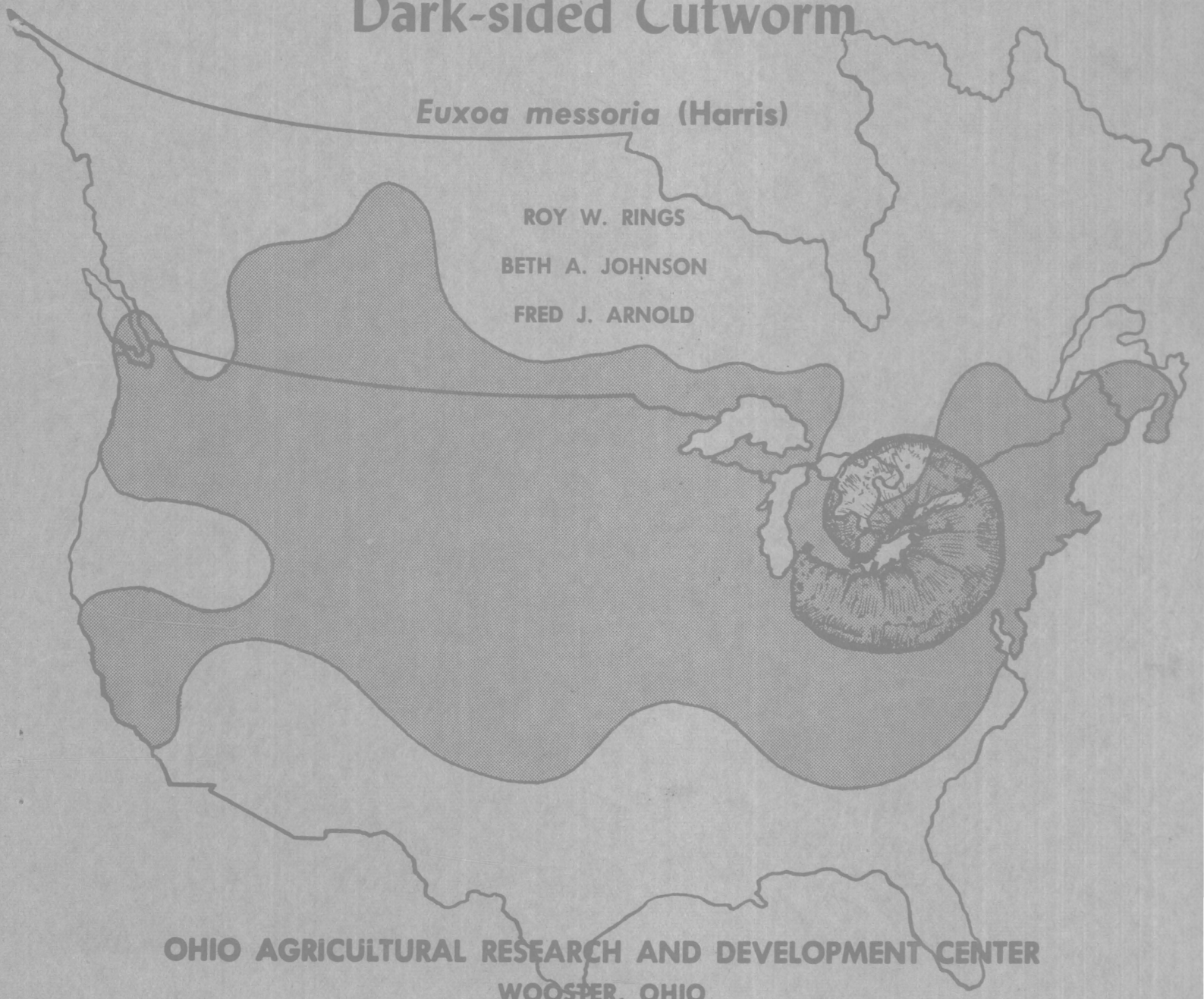

OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER
WOOSTER, OHIO

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Larva of the dark-sided cutworm.

# AN ANNOTATED BIBLIOGRAPHY OF THE DARK-SIDED CUTWORM, *Euxoa messoria* (Harris)

Roy W. Rings[1], Beth A. Baughman[2], and Fred J. Arnold[2]

## Introduction

The purpose of this circular is to consolidate the abstracted literature on the dark-sided cutworm, *Euxoa messoria* (Harris). This publication brings together research and extension information on the developmental biology, taxonomy, ecology, geographical distribution, and control of this economically important species.

The species was originally described by T. W. Harris in 1841. Since then the species has been described and redescribed many times. The complete synonomy is given by Hardwick (1970). However, a partial synonomy of the more important changes is listed below:

*Agrotis messoria* Harris, 1841, p. 324.
*Carneades messoria*; Smith, 1890, p. 169.
*Paragrotis messoria*; Dyar, 1902, p. 144.
*Euxoa messoria*; Hampson, 1903, p. 256.
*Agrotis spissa* Guenée, 1852, p. 261.
*Mamestra inextricata* Walker, 1865, p. 658.
*Mamestra indirecta* Walker, 1865, p. 659.
*Mamestra displiciens* Walker, 1865, p. 660.
*Mamestra expulsa* Walker, 1865, p. 661.
*Euxoa expulsa*; Smith, 1904, p. 98.
*Agrotis ordinata* Walker, 1865, p. 691.
*Agrotis reticens* Walker, 1865, p. 692.
*Agrotis cochranis* Riley, 1867, p. 414.
*Agrotis repentis* Grote and Robinson, 1868, p. 350.
*Agrotis friabilis* Grote, 1875, p. 187.
*Carneades friabilis*; Smith, 1890, p. 176.
*Paragrotis friabilis*; Dyar, 1902, p. 145.
*Euxoa friabilis*; Hampson, 1903, p. 249.
*Euxoa messoria* ab. *friabilis*; Barnes and McDunnough, 1917, p. 42.
*Agrotis atrifera* Grote, 1878, p. 173.
*Carneades atrifera*; Smith, 1893, p. 107.
*Paragrotis atrifera*; Dyar, 1902, p. 149.
*Euxoa atrifera*; Hampson, 1903, p. 300.
*Euxoa messoria territorialis* form *atrifera* McDunnough, 1938, p. 59.
*Carneades territorialis* Smith, 1900, p. 436.
*Paragrotis territorialis*; Dyar, 1902, p. 144.
*Euxoa territorialis*; Hampson, 1903, p. 263.
*Euxoa messoria territorialis*; Barnes and McDunnough, 1917, p. 42.
*Carneades fulda* Smith, 1900, p. 437.
*Paragrotis fulda*; Dyar, 1902, p. 144.
*Euxoa fulda*, Barnes and McDunnough, 1917, p. 42.

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*Carneades pindar* Smith, 1900, p. 451.
*Paragrotis pindar*; Dyar, 1902, p. 149.
*Euxoa pindar*; Hampson, 1903, p. 295.
*Agrotis septentrionalis inordita* Barnes and Benjamin, 1926, p. 303.

The dark-sided cutworm occurs from the Atlantic to the Pacific coast in the northern and central United States and southern Canada. Its western distribution is recorded from as far north as the southern Northwest Territories in Canada and as far south as southern California. It is also recorded from New Mexico, Oklahoma, Tennessee, South Carolina, and Georgia.

The fully grown larva of *Euxoa messoria* is dull gray, faintly striped, but with the sides noticeably darker than the back. More specifically, the "dark side" refers to the more heavily pigmented, broad, supraspiracular stripe. The larva closely resembles *Euxoa tesselata* (Harris), with which it is frequently confused.

The dark-sided cutworm is one of the most destructive general feeding species. It often exhibits exceptional climbing behavior and is recorded as a pest of orchards, vineyards, and nurseries, as well as a wide variety of annual plants. Smith (1892) reported the species in onion fields in New York State in such enormous numbers that acres of onions were utterly destroyed. He also reported heavy infestations from New Jersey in sweet potato fields where workers collected several quarts of cutworms per day for a period of about 2 weeks.

Gossard (1914) reported severe damage to onions by the dark-sided cutworm at Kenton, Ohio. These cutworms were said to have destroyed 30 acres of onion sets in 1 day. Another grower had his field crew handpick 15,000 caterpillars in 1 day.

In southwestern Ontario the dark-sided cutworm has caused serious damage to tobacco since 1961 because, in contrast to most other cutworm species, it is believed to have developed a high degree of tolerance to the cyclodiene insecticides (Harris *et al.* 1962).

The moth is described in detail by Forbes (1954) and illustrated in color by Holland (1934).

The bibliographical information was obtained by a search of the libraries at The Ohio State University and the Ohio Agricultural Research and Development Center for the years 1864 to 1973. The literature search recovered some, but not all, checklists, faunal lists, or comprehensive publications and texts which cannot be abstracted for the recovery of a single species. This publication is not intended to be a comprehensive bibliography for taxonomic purposes, but is believed to be complete as far as references in American abstracting journals are concerned.

The authors have established a current awareness profile on the dark-sided cutworm in cooperation with the Mechanized Information Center of The Ohio State University Libraries. This computerized system of retrieval will aid in keeping this bibliographical information current. Supplementary bibliographical data on the dark-sided cutworm will be summarized at yearly intervals and will be available on request from the Ohio Agricultural Research and Development Center.

The authors are sincerely grateful to the following individuals who provided photocopies, reprints, or literature citations for the bibliography: Dr. G. E. Bucher, Canada Department of Agriculture, Research Station, Winnipeg, Manitoba; Dr. C. R. Harris, Research Institute, Canada Department of Agriculture, London, Ontario;

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Entries are listed alphabetically by author except in cases where the publication is anonymous or more likely to be identified with the governmental agency under which it was published. The abbreviations in the citations follow the American standard for periodical title abbreviations which was published in Biological Abstracts, 45(13):4347-4361. Nearly all references in this publication deal with *Euxoa messoria* (Harris); however, the scientific name used in an original article is also used in the annotation so that there is no question as to the species being cited. The name in current usage is also given in the annotation unless it is in quotes. The numbers in parentheses following the annotation represent the page numbers which include information on the dark-sided cutworm if they are different from the citation page numbers.

## Bibliography


Allen, H. W. 1926. Observations upon the early maggot stage of *Linnaemyia comta* Fall. (Diptera:Tachinidae). Entomol. News 37(9):283-285.
This parasite, *Linnaemyia comta* Fall., is widely distributed in Europe and occurs from southern Canada to Central America. It is parasitic on *Agrotis ipsilon, Euxoa messoria, Feltia annexa, Peridroma saucia, Porosagrotis orthogonia,* and *Spodoptera frugiperda.* (283)

Anderson, P. J. and T. R. Swanback. 1950. Tobacco seed beds. Conn. Agr. Exp. Sta. Circ. 175:1-31.
Several species of cutworms feed on tobacco. At least two of these species, the dark-sided cutworm (*Euxoa messoria*) and the W-marked cutworm (*Spaelotis clandestina*), caused damage in the seedbeds. The first species infests isolated spots in the beds while the second often causes severe damage. (27)

Anonymous, 1891. Official minutes of the meeting of the entomological club of the A.A.A.S., 1891. Can. Entomol. 23:203-222.
A cutworm described as the dark-sided cutworm, *Agrotis* (=*Euxoa*) *messoria* was later confirmed to be *Agrotis ypsilon.* (220)

Apgar, A. C., J. B. Smith, and W. H. Werner. 1910. The insects of New Jersey. Annu. Rep. N. J. State Mus. 1909:455.
"*E. messoria* Harr. Common throughout the state, June to September. The larva known as the "reaping rustic" is the most injurious and abundant of our early cut-worms and is especially troublesome in south Jersey on sweet potatoes. The bran-arsenic remedy works perfectly for this species."

Arnott, D. A. and H. W. Goble. 1943. The value of molasses-free baits in the control of cutworms in tobacco fields. Rep. Entomol. Soc. Ontario 73:30-37.
*Euxoa messoria* was found to be among the cutworms infesting tobacco fields at Delhi and Teeterville, Ontario. They were the most prevalent at Teeterville. (31)

Banham, F. L. 1960. Soil insecticides for control of the tuber flea beetle, *Epitrix tuberis* (Gent.), in the interior of British Columbia. Can. J. Plant Sci. 40(1): 165-171.
"Field observations in the experimental plots during the growing season and at harvest indicated that aldrin, chlordane, dieldrin or heptachlor soil treatments applied against the tuber flea beetle effectively controlled other common soil inhabiting insect pests such as wireworms *Elateridae* spp., white grubs, mainly *Phyllophaga anixia,* and cutworms, mainly *Euxoa ochrogaster* and *Euxoa messoria,* as well as the tuber flea beetle." (171)

Barnes, W. and J. H. Benjamin. 1926. Notes and new species (Lepid. Phalaenidae). Can. Entomol. 58:303-310.
The authors described *Euxoa messoria* as a new species, *Agrotis septentrionalis inordita.* (303)

Barnes, W. and J. H. McDunnough. 1912. Contributions to the natural history of the Lepidoptera of North America. Decatur, Ill., 1(4):1-57.
"18. EUXOA TERRITORIALIS Sm. Eureka, Ut. This name will probably fit the species figured as well as any other of the *messoria* group. It agrees well with a co-type in our possession from Glenwood Springs." (38)

Barnes, W. and J. McDunnough. 1917. Check list of the Lepidoptera of boreal America. Decatur, Ill., Herald Press:42.
"1304 *messoria* Harris, *spissa* Gn., *inextricata* Wlk., *indirecta* Wlk., *displiciens* Wlk., *expulsa* Wlk., *ordinata* Wlk., *reticens* Wlk., *cochrani* Riley, *repentis* G. & R., *confracta* Morr. ab. *friabilis* Grt., a *territorialis* Sm., *fulda* Sm."

Beirne, B. P. 1971. Pest insects of annual crop plants in Canada. I. Lepidoptera. II. Diptera. III. Coleoptera. Mem. Entomol. Soc. Can. 78:1-124.
This species is most important as a pest of tobacco in southern Ontario. There the larvae feed first on rye until it is plowed down in late April and then on tobacco that is planted in its place. It can cause serious damage to seedlings and transplants of various crops, and has done so especially in British Columbia but often in Ontario. It is often common in gardens. Plants attacked include peas, beans, potatoes, tomatoes, cucumbers, melons, sweet peppers, asparagus, alfalfa, corn, barley, strawberries, and spruce seedlings. (15)

Bethune, C. J. S. 1888. Remedies for noxious insects. Entomol. Soc. Ontario Annu. Rep. 18:51-59.
The author describes and figures the larva and moth of *Agrotis cochranii* Riley (=*Euxoa messoria*). Sprinkling the plants with air-slaked lime, ashes, or powdered hellebore was recommended. (57)

Beutenmüller, W. 1901. Descriptive catalogue of the Noctuidae found within fifty miles of New York City. Amer. Mus. Nat. Hist. Bull. 14:229-312.
The caterpillar, moth, and food plants of the dark-sided cutworm, *Carneades* (=*Euxoa*) *messoria*, are described. The dark-sided cutworm was common from June until late September. The markings are usually prominent and give the species a characteristic appearance. (284)

Blackmore, E. H. 1918. Entomology Rep. Prov. Mus. Nat. Hist. Brit. Columbia for 1917:9-15.
A rather severe outbreak of cutworms occurred in the Victoria and Vancouver districts during May and the early part of June, whole beds of garden produce being completely devastated. The chief pests concerned were *Feltia ducens* Wlk. (dingy cutworm), *Sidemia devastatrix* Brace (glassy cutworm), and the larvae of *Euxoa messoria* Grote, *E. excellens* Grote, and *Feltia vancouverensis* Grote. (180)

Bowles, G. J. 1880. Canadian cutworms. Annu. Rep. Entomol. Soc. Ont. for 1879: 37-46.
The author gives descriptions and figures of the larva and moth of *Euxoa messoria* Harris (=*Agrotis cochranii*). Its climbing habits on fruit trees are described. Frequently first-season orchards on sandy soils lose from 50 to 75 percent of their trees. (42)

Brimley, C. S. 1938. The insects of North Carolina. N. C. Dept. Agr. 560 pp.
"*E. messoria* Harr. Raleigh, August - October." (270)

Bucher, G. E., T. A. Angus, and J. Kryiwenczyk. 1966. Characteristics of a new strain of *Bacillus thuringiensis* var. *thuringiensis* Berliner (serotype I) isolated from the bumblebee wax moth. J. Invert. Path. 8(4):485-491.
A new strain of *Bacillus thuringiensis*, 562-5A, 30 to 70 times as virulent for larvae of *Euxoa messoria* (Harris) and *Bombyx mori* (L.) as previously isolated strains of serotype I, produced rapid paralysis in the silkworms and inhibited feeding of the cutworm larvae. (488-489)

Bucher, G. E. 1969. *Euxoa messoria* (Harris), dark-sided cutworm (Lepidoptera: Noctuidae). Commonwealth Inst. Biol. Control Trinidad. Tech. Comm. 4:16-18.
"*Euxoa messoria* (Harris), the dark-sided cutworm, is perhaps the most serious pest of tobacco in Ontario. The light sandy soils of the main tobacco area along the north shore of Lake Erie are favorable for the development of this cutworm...Larvae damage the plants in several ways: they may cut the stem at ground level, thus causing complete destruction of the seedling; they may injure the terminal shoot and stimulate the plant to grow suckers, which do not produce a good yield of harvestable leaves; and they may eat the leaves themselves... Present control consists of killing the young larvae before the tobacco seedlings are transplanted, by spraying insecticides (usually DDT) on the rye before it is ploughed, or on the soil prepared for the seedlings, or both." (16)

Bucher, G. E. 1970. Cutworms in tobacco. Control by virus diseases. Can. Agr.: 37-39.
"Cutworms, root maggots, and hornworms are the chief insect pests of tobacco in Ontario. Though several species of cutworms attack tobacco, the dark-sided cutworm, *Euxoa messoria* (Harris), causes the most damage." (37)

Bucher, G. E. 1970. Control of cutworms in tobacco by virus diseases. The Lighter 40:14-19.
Identical with the article by Bucher (1970) that appeared in Canadian Agriculture, pp. 37-39.

Bucher, G. E. and H. H. Cheng. 1970. Use of trap plants for attracting cutworm larvae. Can. Entomol. 102(7):797-798.
*Euxoa messoria* (Harris) was a serious pest of tobacco in the tobacco-rye rotation in southwestern Ontario. Preliminary observations indicate that high populations of cutworms can be concentrated in a small area by a few attractive trap plants of tobacco.

Bucher, G. E. and H. H. Cheng. 1971. Mortality in larvae of *Euxoa messoria* (Lepidoptera:Noctuidae) collected from the tobacco area of Ontario. Can. Entomol. 103(6):888-892.
"Larvae of the dark-sided cutworm were collected from trap plants of tobacco set in a field of rye at Delhi, Ontario, in 1969. They were reared individually to pupation to determine the degree of survival and the causes of mortality from the fourth instar to maturity. About 36% pupated and the greatest amount of mortality was caused by insect parasitism, a microsporidial disease and bacterial infection." (888)

Bucher, G. E. and D. M. Macleod. 1974. Rediscovery of *Tarichium megaspermum* (Entomophthoraceae) in Canadian cutworms (Noctuidae). J. Invert. Path. 23:157-163.
"The fungus *Tarichium megaspermum* has not been reidentified conclusively in the literature since its original description by Cohn in 1870. It was a major cause of disease of the red-backed cutworm in British Columbia, Canada, in 1957 and 1959 and a minor cause of disease of the dark-sided cutworm in Ontario, Canada, in 1971. Populations of both host species were also infected with the conidial state of a fungus identified as *Entomophthora virescens*. Modern descriptions and photographs of the fungi are given." (157)

Butler, A. G. 1889. XIV Synonymic notes on the moths of the earlier genera of Noctuites. Trans. Entomol. Soc. Lond.:375-387.

"15 *Agrotis spissa*. *Agrotis spissa*, Guenée, Noct., i., p.261, n. 415 (1852). An example of this species in the Grote collection is labeled as *A. cochranii* of Riley; the latter, however, though nearly allied to *A. spissa*, is possibly distinct; it is much darker." (379)

The Canadian Agricultural Insect Pest Review

This publication aims to present, in manuscript form, a periodical statement on current insect pest conditions. It presents data governing the seasonal appearance, the effects of winter, degrees of parasitism, notes on distribution, and abundance of insect pests. It has been published by the Canada Department of Agriculture, Research Branch--Scientific Information Section, Ottawa, Ontario, from 1923 to present. From 1923 to 1967, this publication was known as the Canadian Insect Pest Review.

1925. Can. Insect Pest Rev. 3.
Cutworms, of which the dark-sided cutworm was the most prevalent, have been quite common on cruciferous crops in Hemingford district, Quebec, and on potatoes at Covey Hill. (22)

1927. Can. Insect Pest Rev. 5.
Cutworms were present over the whole cultivated portion of Manitoba during 1926, and caused great damage in many localities. The species involved in nearly every case was the red-backed cutworm, but in the Winnipeg region, the dark-sided cutworm was equally injurious and in a few places was the dominant species. (3)

1931. Can. Insect Pest Rev. 9.
In the Clarenceville district, Quebec, the dark-sided cutworm and possibly other species caused complete destruction of all tomato transplants in a local garden. (53). Important damage has been caused in a few cases by the dark-sided cutworm at Clarenceville, Que. This is the most common of local species of injurious cutworms. (76)

1932. Can. Insect Pest Rev. 10.
"Alfalfa was being seriously damaged over a large area in East-Central Nebraska by *Euxoa messoria* Harr." (19) The dark-sided cutworm was associated with the glassy, black, and other species of cutworms in Maxville, Apple Hill, and Munro's Mills, Ontario, and has been injurious to corn, grain, and small garden crops. (49)

1933. Can. Insect Pest Rev. 11.
In eastern Ontario, reports from various localities indicated an increase over the preceding year, damage to corn, grain, garden crops, flowers, etc., being affected by several species, notably the dark-sided cutworm and the black cutworm. (4)

1935. Can. Insect Pest Rev. 13.
The dark-sided cutworm was fairly abundant in isolated alfalfa fields on sandy ridges at Caradoc, Ontario. Some of the larvae were infested by dipterous parasites. Some garden patches were completely wiped out by the dark-sided cutworm at Caradoc and Strathroy, Ontario. A variety of plants were affected. (83)

1936. Can. Insect Pest Rev. 14.
*Euxoa messoria* (Harris) was decidedly injurious to field and garden crops in the Strathroy district in Ontario. (45) The dark-sided cutworm was fairly abundant in

some fields of clover and alfalfa in Middlesex and Elgin counties, Ontario, but no serious injury was caused to the 1936 crop. This species was present annually but rather scarce in some years. The dark-sided cutworm was moderately abundant in most clover fields where soil was light and sandy in Middlesex and Elgin counties, Ontario. Some small local gardens at Strathroy and Caradoc, Ontario, were completely wiped out by this species, necessitating re-seeding of carrots, beets, lettuce, and tomatoes. This cutworm was recorded annually but not in such numbers in isolated spots. The dark-sided cutworm was fairly common wherever cutworm injury was detected on clover, alfalfa, and seedling garden corn in Middlesex and Elgin counties, Ontario, but possibly not as abundant as in 1935. (80)

1937. Can. Insect Pest Rev. 15.
*Euxoa messoria* was moderately abundant on crops in western Ontario. (33) The dark-sided cutworm was quite abundant and destructive to helenium, peas, lettuce, radish, and tomato in some early planted regional gardens at Strathroy, Ontario, and environs. (75)

1941. Can. Insect Pest Rev. 19.
Adults of the dark-sided cutworm were observed at lights in small numbers at Marmora, Ontario. (G. H. Hammond, Aug. 25). (250)

1942. Can. Insect Pest Rev. 20.
The dark-sided cutworm was the most abundant cutworm species found in tobacco fields around Simcoe and Delhi in Ontario. (228)

1943. Can. Insect Pest Rev. 21.
Occasional specimens of the dark-sided cutworm were found in northwest Saskatchewan. (70) *Euxoa messoria* was among the cutworms found to be infesting tobacco fields in the Delhi-Simcoe area of Ontario during the period from late May to the end of June. (192-193)

1944. Can. Insect Pest Rev. 22.
"Tobacco cutworms--*Euxoa messoria* (Harr.), *E. tessellata* Harr., and *E. detersa* var. *personata* Morr.--commonly infested tobacco fields in June and to the beginning of July. Generally their damage was not severe except on high, light land. Satisfactory control was obtained from baits applied on suitable nights." (30) Cutworms, *Euxoa messoria* (Harris), *E. detersa* var. *personata* Morrison, and *E. tessellata* (Harris), commonly infesting tobacco fields in the Delhi district of Norfolk County, Ontario, were much less abundant and destructive in 1944 than in the past few years. (184)

1946. Can. Insect Pest Rev. 24.
*Euxoa messoria* (Harris) was among the more abundant species of moths taken at a light trap in Lethbridge, Alberta, in 1945. (104) The dark-sided cutworm was seen in Saskatchewan. (347)

1949. Can. Insect Pest Rev. 27.
The dark-sided cutworm was less numerous than usual on flue-cured tobacco in Norfolk County, Ontario. (64) The dark-sided cutworm did more than usual damage to tobacco in both the new and old tobacco belts. In some fields in Ontario, 40 percent of the plants were attacked. (164)

1950. Can. Insect Pest Rev. 28.
*Euxoa orchrogaster* (Guenée), *E. messoria* (Harris), and other species of cutworms were less abundant than usual in 1950. Five to ten percent of seedling

onions were damaged at Brandon and Portage la Prairie, Manitoba, but few complaints were received from gardeners. (41) The dark-sided cutworm was more numerous and injurious to newly set tobacco in both the "new" and "old" tobacco belts than in 1949. In one field near Chatham, Ontario, about 40 percent of the tobacco plants were attacked. Night temperatures below 50° F. did not appear to deter feeding. (50)

1951. Can. Insect Pest Rev. 29.
Miscellaneous cutworms, including *Euxoa messoria* (Harris), *Agrotis ipsilon* (Hufnagel) and *feltia* sp., caused early season moderate damage to tobacco ranging as high as 10 to 15 percent in individual fields in districts surrounding Chatham and Delhi, Ontario. (62) In Ontario the dark-sided cutworm damaged 8 to 10 percent of the fruit in a strawberry plantation mulched with sawdust; other plots were less severely damaged. (271)

1952. Can. Insect Pest Rev. 30.
*Euxoa messoria* (Harris) was present in sawdust mulch in a strawberry plantation at the MacDonald's Corner Sub-Experimental Station, New Brunswick, in numbers amounting to approximately 80 cutworms per 100 feet of strawberry row. From 8 to 10 percent of the ripening fruit was injured. Other plots in the same plantation were not so heavily infested. (99)

1955. Can. Insect Pest Rev. 33.
The dark-sided cutworm occurred on asparagus and hops in the Kamloops district of British Columbia. (339)

1956. Can. Insect Pest Rev. 34.
The dark-sided cutworm was economically important in southwestern Ontario in 1956. (273)

1957. Can. Insect Pest Rev. 35.
The dark-sided cutworm was among the cutworms generally causing light injury in untreated fields of tobacco in the counties of Kent, Elgin, Norfolk, and Brant, Ontario. Severe injury was reported to flue-cured and burley tobacco on a few farms in the townships of Harwich, Howard, and Orford in Kent County, Ontario. (63) A severe infestation of the dark-sided cutworm attacked strawberries at Cedar Springs, Ontario. Prompt application of poisoned bait prevented serious injury. (64) Minor infestations in crops and home gardens in British Columbia included the dark-sided cutworm. (268)

1958. Can. Insect Pest Rev. 36.
Cutworms, believed to be mainly *Euxoa ochrogaster* (Guenée) and *E. messoria* (Harris), caused light to moderate damage in vegetable gardens and field crops in the Kamloops, Vernon, Westbank, Summerland, and Keremeos districts of British Columbia. The infestation was general throughout all districts but no serious outbreaks were reported. In the Kamloops and Vernon area, damage was less severe than in 1953 or 1954. In the other areas, damage was comparable to that of 1957. (124) Light to moderate infestations of cutworms, probably including the dark-sided cutworm, caused light to moderate damage in fields and vegetable gardens in the Kamloops and North Okanagan districts in British Columbia. (158-159) The dark-sided cutworm was more numerous than in 1957 in Kings County, Nova Scotia, and caused moderate damage to various vegetables. (161) Recent surveys in the southern interior of British Columbia showed that cutworm infestations and damage occurred mostly during spring and early summer and again, to a lesser degree, in midsummer. The dark-sided cutworm was among the 23

species of cutworms found. During spring and early summer, the dark-sided cutworm was one of the two most abundant cutworms. Among 50 infestations examined, 18 were mostly *Euxoa messoria* (Harris). In the districts of Westsyde, Armstrong, and Lavington, British Columbia, *E. messoria* appeared more abundant than *E. ochrogaster*. (252) The dark-sided cutworm was one of the two most abundant species in southern British Columbia, infesting and damaging farm crops and flower and vegetable gardens. In the Kamloops, Vernon, and Armstrong districts of British Columbia, *E. messoria* appeared to be the most abundant species and more abundant than in 1957. In the Cawston and Keremeos districts, British Columbia, where surveys were made for the first time in 1958, *E. messoria* was the most abundant cutworm. (280)

1959. Can. Insect Pest Rev. 37.
During spring and early summer, infestations of the dark-sided cutworm were general throughout the dry southern interior of British Columbia in the districts of Kamloops, Armstrong, North Okanagan, Merritt, and Keremeos. *E. messoria* was more widely distributed and more abundant than in the past 3 years, and in the Armstrong district was the dominant species infesting barley and pea crops. (11) The dark-sided cutworm was more numerous than last year in vegetable gardens in Kings County, Nova Scotia. (104) The dark-sided cutworm killed numerous small spruce seedlings in a restricted area in a nursery at Lawrencetown, Nova Scotia. (190) A map of the known distribution of the dark-sided cutworm in Canada is on the page opposite 124. The dark-sided cutworm was taken at light traps in Chatham, Ontario, between Sept. 16 and Oct. 15, 1969. (237)

1960. Can. Insect Pest Rev. 38.
*E. messoria* heavily infested a few new seedlings in the Kamloops district, British Columbia, but the infestation subsided. (10) It injured spruce seedlings at Lawrencetown, Nova Scotia. (93) *E. messoria* were taken at the Chatham, Ontario, light trap August 15 to Sept. 15 (223) and Sept. 16 to Oct. 15. (224)

1961. Can. Insect. Pest Rev. 39.
*E. messoria* was generally distributed throughout the Oliver-Osoyoos district, British Columbia. (9) It was abundant in certain areas of Kings and Annapolis counties, Nova Scotia. (90) It was collected at the Chatham, Ontario, light trap from July 16 to Sept. 15. *E. messoria* appeared to be cyclodiene-resistant. (244) It heavily injured tobacco on four farms in Norfolk County, Ontario. (340)

1962. Can. Insect Pest Rev. 40
In Norfolk and Elgin counties, Ontario, up to 90% of flue-cured tobacco plants were severed at the soil surface by *E. messoria*. (36) It continued to attack tobacco in Norfolk County until after June 28. (59) Adults emerging from larvae collected on tobacco were identified as *E. messoria*. (92) Adults caught in light traps at Chatham and Fairground, Ontario. (93) *E. messoria* damaged flue-cured tobacco in Ontario. (117) A severe outbreak of *E. messoria* occurred at Salmon Arm, British Columbia, in 1918. (120) Five fungous organisms were recovered from *E. messoria, Entomopthora* sp., *Sorosporella uvella, Beauveria globulifera*, and two unidentified species. *E. messoria* was parasitized by 12 species of Hymenoptera. (121) A major outbreak of dark-sided cutworm occurred on tobacco in Norfolk County, Ontario, in June. (230)

1963. Can. Insect Pest Rev. 41.
*E. messoria* caused severe injury to flue-cured tobacco in Norfolk County, Ontario, (45, 89) and considerable injury to a corn field in the same county. (72) *E. messoria* was collected on flue-cured tobacco near Delhi, Ontario. (127) It

was destructive to vegetable gardens in Norfolk County, Ontario. (219) A cyclodiene-resistant strain of *E. messoria* attacked tobacco in outbreak numbers in Norfolk County for the second consecutive year. (220)

1964. Can. Insect Pest Rev. 42.
The cyclodiene-tolerant strain of the dark-sided cutworm severely damaged flue-cured tobacco in Norfolk County, Ontario, and adjacent growing areas for the third consecutive year. (194)

1965. Can. Insect Pest Rev. 43.
In southwestern Ontario, the dark-sided cutworm severely damaged tobacco and strawberry. (93) The dark-sided cutworm injured burley tobacco in some fields in Kent County, Ontario, which had been treated with an aldrin-fertilizer mixture. A major outbreak of the cyclodiene-tolerant strain of this species occurred in May and June in Norfolk and adjacent counties in Ontario. These materials failed to protect tobacco in the Aylmer and Port Stanley districts of Ontario for the first time. (97) A few inquiries were received about cutworms in corn but damage was not as prevalent as in 1964. In the Highgate area, however, about 100 acres were involved on several farms and damage was severe. The species involved was mainly the dark-sided cutworm. (217) A major outbreak of this species occurred in May and June, particularly in Norfolk County, Ontario, and adjacent tobacco-growing areas. Cyclodiene insecticides failed to provide adequate control in the Aylmer and Port Stanley growing areas for the first time. Larval injury also occurred in several burley tobacco fields in Kent County, Ontario, which was treated improperly with an aldrin-fertilizer mixture. (218)

1969. Can. Insect Pest Rev. 47.
An average of 25 larvae of the dark-sided cutworm per 100 plants in untreated tobacco near Delhi, Ontario, caused a crop loss of approximately 18 percent. (13)

1970. Can. Insect Pest Rev. 48.
At Delhi, Ontario, an average of 32 larvae of the dark-sided cutworm per 100 plants caused approximately 20 percent crop loss in an untreated tobacco field. (14) The dark-sided cutworm eliminated various spring crops in Norfolk County, Ontario. (18)

1971. Can. Insect Pest Rev. 49.
In one untreated tobacco field in the Delhi, Ontario, area, the dark-sided cutworm caused a total loss of the crop. Populations averaged 112 larvae per 100 plants. In Nova Scotia, the dark-sided cutworm was the most prevalent species; damage was usually light to moderate. (14) In the Annapolis Valley of Nova Scotia, populations of the dark-sided cutworm were low. (18)

Case, F. W. 1881. Entomological notes. Wis. State Agr. Soc. 19:480-485.
The larva and adult of the dark-sided cutworm are illustrated in Figure 20. A general description of climbing cutworms is given and it is suggested that the dark-sided cutworm is the most common climbing cutworm. (484)

Chamberlin, F. S. and N. Allen. 1957. Tobacco cutworms. How to control them. U. S. Dep. Agr. Leaflet 417:1-8.
"The dark-sided cutworm has a prominent white stripe on the side, and has dark freckles on the head. This is a northern species that has done great damage to a variety of crops. The moths lay their eggs only on cultivated fields." (4)

Cheng, H. H. 1970. Bayer 37289 for control of the dark-sided cutworm. Ann. Entomol. Soc. Amer. 15:3-5.
Bayer 37289 (O-ethyl 0-2, 4, 5-trichlorophenyl ethylphosphonothioate) was applied as a soil treatment under natural environmental conditions at rates of 1.5 and 3 lb. actual toxicant per acre for control of the dark-sided cutworm attacking flue-cured tobacco in Ontario. The high dosage significantly reduced the number of plants damaged by the species, but the low dosage gave poor control. These results showed that a single application of Bayer 37289 at the rate of 3 lb. actual per acre, incorporated into the soil, could apparently provide excellent control of the field population of the dark-sided cutworm.

Cheng, H. H. 1970. Characters for distinguishing the sex of pupae of the dark-sided cutworm *Euxoa messoria* (Harris), (Lepidoptera:Noctuidae). Can. J. Zool. 48(3): 587-588.
A reliable method for determining the sex of pupae of *E. messoria* is to observe the structures found on the ventral side of the terminal abdominal segments. Male and female pupae are illustrated.

Cheng, H. H. 1971. Assessment of tobacco losses caused by the dark-sided cutworm, *Euxoa messoria*. Can. Entomol. 103(4):534-541.
"Intensive studies on the damage and losses of flue-cured tobacco caused by the dark-sided cutworm, *Euxoa messoria* (Harris), were carried out in the field at Delhi, Ont., during 1967 and 1968. A new method for estimating the accurate tobacco crop losses is illustrated. Assessment of damage of the tobacco plant and the population density in relation to the yield are described. The yield was significantly related, negatively, to the dark-sided cutworm density, and was reduced in the cutworm-damaged blocks in comparison with the yield in the undamaged check blocks. Assessment of average losses caused by the species was 17% of marketable tobacco which, based on the average current prices, would amount to $200 per acre or approximately $25 million over the country as a whole every year." (534)

Cheng, H. H. 1971. Field studies on the chemical control of the dark-sided cutworm (Lepidoptera:Noctuidae) on tobacco in Ontario, with particular reference to Dursban. Can. Entomol. 103(5):649-653.
"DDT, carbaryl, Dursban (O,O-diethyl 0-3, 5, 6-trichloro-2-pyridyl phosphorothioate), and AC-47031 (cyclic ethylene (diethoxyphosphinyl) dithiomidocarbonate) were applied at different rates on rye and/or soil for control of the dark-sided cutworm, *Euxoa messoria* (Harris), attacking flue-cured tobacco in Ontario. All insecticides tested caused significant reductions in cutworm damage in comparison with the untreated check. Dursban at 1/2 lb./acre on rye, or 1 lb./acre incorporated in the soil tended to give better control than DDT at 4 lb./acre on soil and showed a significant difference from split applications of DDT at 1-1/4 lb./acre on rye and 4 lb./acre on soil in the large scale test. Carbaryl and AC-47031 showed less effect than DDT. There was no advantage in the split application of DDT or Dursban on rye and on soil since each treatment singly could provide effective control of this pest. Rye treatment is more economic than soil treatment and could apparently provide adequate control. Dursban showed promise as a substitute for DDT for control of the dark-sided cutworm in tobacco fields." (649)

Cheng, H. H. 1972. Oviposition and longevity of the dark-sided cutworm, *Euxoa messoria* (Lepidoptera:Noctuidae), in the laboratory. Can. Entomol. 104(6): 919-925.

"In the laboratory, the mean number of eggs laid per female of the dark-sided cutworm, *Euxoa messoria* (Harris), fed on honey solution was 1303.8; when given water alone, 261.3; and 86.4 when held without food or water. Adult food significantly increased the longevity and oviposition period and reduced the pre-oviposition period. There was no significant difference between the weight of male and female pupae. The weight of the female pupae was significantly correlated with: the oviposition period; the number of eggs laid; the longevity, except moths fed on honey solution; but not the pre-oviposition period, regardless of food taken as adults. Females fed on honey solution mated successfully, 30% of them more than once. When given water or nothing, the number of mated females was reduced. Dissections showed that adult food accelerated the development of eggs and increased the fecundity potential." (919)

Cheng, H. H. 1972. Greenhouse studies on insecticidal control of the dark-sided cutworm on tobacco seedlings. Tobacco Science 16:75-77.
Five insecticides were applied to tobacco seedlings in the greenhouse for control of the dark-sided cutworm, *Euxoa messoria* (Harris), in Ontario. Each insecticide significantly reduced cutworm damage compared to the untreated check. Dursban (0,0-diethyl 0-3,5,6 - trichloro - 2 - pyridyl phosphorothioate) gave better control than DDT, but was highly phytotoxic to seedlings. Carbaryl was less effective than DDT, trichlorfon, and methoxychlor and was slightly phytotoxic. DDT, trichlorfon, and methoxychlor were similar in degree of effectiveness, and had no visible effect on the seedlings. (75)

Cheng, H. H. 1973. Observations on bionomics of dark-sided cutworm, *Euxoa messoria* (Lepidoptera:Noctuidae), in Ontario. Can. Entomol. 105(2):311-322.
"The dark-sided cutworm, *Euxoa messoria* (Harris), has a North American distribution and is commonly found in tobacco fields in Ontario. It has one generation a year, and overwinters as an egg in the soil. Hatching takes place in early April and the young larvae feed on the rye rotation crop; later they attack newly transplanted tobacco seedlings. Head width measurements of larvae collected from the field show seven instars, but individual rearing data of *E. messoria* larvae reveal that small numbers pass through six and an occasional larva passes through eight; however, the eighth instar has the same head width as the seventh. Pupation occurs from late July to mid-August in the soil. The adult emerges from mid-August to October, and oviposition occurs in this same period. Eggs are completely developed before winter. Behaviour and duration of the different stages are described. Natural mortality factors of the species are given." (311)

Cheng, H. H. 1973. Laboratory and field tests with *Bacillus thuringiensis* against dark-sided cutworm, *Euxoa messoria* (Lepidoptera:Noctuidae), on tobacco. Can. Entomol. 105(7):941-945.
"Laboratory tests were conducted to determine the susceptibility of the various larval stages of *Euxoa messoria* (Harris) in Ontario to four commercial preparations of *Bacillus thuringiensis* Berliner: Thuricide 90TS, Thuricide -HP, Biotrol BTB 183, and Dipel. A field test was made to determine whether these preparations could be as effective as Dursban (0,0-diethyl 0-3,5,6-trichloro-2-pyridyl phosphorothioate) for control of this species when applied on the rye cover crop in spring. In laboratory tests, first to third instar larvae which fed on rye leaves treated with all four *B. thuringiensis* preparations were found to be susceptible regardless of the rates applied. Mortality of fourth to seventh instar larvae fed treated tobacco leaves was low. Thuricide 90TS and Biotrol BTB 183 as applied in the field for control of *E. messoria* populations were relatively ineffective as compared with Dursban." (941)

Cheng, H. H. 1973. Further field evaluation of insecticides for control of the dark-sided cutworm (Lepidoptera:Noctuidae) on tobacco in Ontario. Can. Entomol. 105:1351-1357.
"Field tests were continued during 1970, 1971, and 1972 in southwestern Ontario to evaluate experimental and registered insecticides for control of *Euxoa messoria* (Harris) larvae on tobacco. Insecticides were applied before planting as broadcast applications to the rye cover crop or to the soil. Of 10 chemicals tested, chlorpyrifos, leptophos, and N-2596 (S-(p-chlorophenyl O-ethyl-phosphonodithioate) gave the most consistent control, and Biothion (O,O'-thiodi-p-phenylene O,O,O',O'-tetramethyl phosphorothioate) and methoxychlor gave variable control. Fensulfothion was slightly phytotoxic, and trichlorfon and Mobam (benzo [b] thien-4-yl methylcarbamate) were ineffective in the present study. Supracide (O,O-dimethyl phosphorodithioate S-ester with 4-(mercaptomethyl)-2-methoxy-$\Delta^2$-1,3,4-thiodiazolin-5-one) and Orthene (O,S-dimethyl N-acetyl phosphoramidothioate) showed promise for control of *E. messoria* larvae." (1351)

Chittenden, F. H. 1907. Insects injurious to vegetables. Orange Judd Co., London, England. 262 pp.
"In 1885, near Goshen, New York, this cutworm (shown in figure 160) threatened the extinction of the onion industry, the annual value of which was estimated at half a million dollars. Although the people worked day and night to keep down the pest, the yield was reduced during that and the following year about one-half, or a total cash loss of about $500,000." (246)

Chittenden, F. H. 1912. Insects injurious to the onion crop. U.S. Dep. Agr. Yearbook 1911:319-333.
The dark-sided cutworm has been an important onion pest in the United States since 1885. This species damaged onions in Stark County, Indiana, in 1911. (332)

Cook, A. J. 1875. Insects injurious to the farm, garden, and orchard. Mich. State Bd. Agr. Sec. Annu. Rep. for 1874. 13:106-152.
A general description is given for cutworms. A plate of the dark-sided cutworm (*Agrotis cochrani=Euxoa messoria*) is given. (110)

Cook, W. C. 1920. Cutworms and armyworms. Office State Entomol. Minn. Circ. 52:1-8.
A field key is given for determining the more common Minnesota cutworms. (4)
The dark-sided cutworm has a life history similar to the dingy cutworm. These two species work somewhat earlier than the striped cutworm, pupating in early June; however, the pupae remain in the ground longer so that the moths are laying eggs at about the same time. (7)

Cook, W. C. 1930. Some influences of location upon light trap catches. Can. Entomol. 62(5):95-98.
A light trap situated in a window of the third story caught a greater variety of noctuids than a nearby trap 6 feet above ground level. It was believed the ground trap caught more local species, while the "building trap" caught more migrants. (97)

Cook, W. C. 1930. An ecologically annotated list of the Phalaenidae of Montana (Lepid.). Can. Entomol. 62:257-277.
"1304 *E. messoria* Harr. Statewide in distribution. Common everywhere. August-September. Larvae have been reared from sweet clover, alfalfa, phlox (with

ridingsiana), lupines, and tumbling mustard. The larva works very late in the spring and has been recovered as late as June 20. There is a very short prepupal period." (264)

Cook, W. C. 1934. Cutworms and armyworms. Minn. Agr. Exp. Sta. Circ. 48:1-8.
The dark-sided cutworm (*Euxoa messoria*) is a dull gray color with very faint stripes like the striped cutworm. The sides are darker than the top. (4) The dark-sided cutworm (*Euxoa messoria*) was a serious pest of garden and field crops in Minnesota, especially onions. (8)

Cooley, R. A., J. R. Parker, W. C. Cook, W. B. Maybee, and C. N. Phillip. 1928. Work done by the entomological department. Montana Agr. Exp. Sta. 1926-1927. 34th Annu. Rep.:90-96.
The year 1926 was marked by an abnormal abundance of *Euxoa messoria*, a destructive cutworm of the eastern states, but this species decreased in 1927 without causing any severe damage. (94)

Coquillett, D. W. 1897. Revision of the Tachinidae of America north of Mexico. U. S. Dep. Agr., Div. Entomol. Tech. Ser. 7:1-156.
Parasites bred from *Carneades (Euxoa) messoria* were identified as *Aphria ocypterata* Town. and *Linnaemyia comta* Fall.

Crosby, C. R. and M. D. Leonard. 1918. Manual of vegetable-garden insects. The MacMillan Co., New York. 391 pp.
Descriptions of the larvae, pupae, and adult *Paragrotis* (=*Euxoa*) *messoria* and a list of food plants are given. (268-269)

Crumb, S. E. 1915. A key to the cutworms affecting tobacco. J. Econ. Entomol. 8:392-396.
This article features a key to the more important cutworms attacking tobacco. The head shield of *Euxoa messoria* is illustrated. (395)

Crumb, S. E. 1926. Tobacco cutworms and their control. U. S. Dep. Agr. Farmers' Bull. 1494:1-13.
The seasonal history, geographical distribution, host range, larval habits, larval description, and control of the more important cutworms attacking tobacco, including *Euxoa messoria*, are given.

Crumb, S. E. 1929. Tobacco cutworms. U. S. Dep. Agr. Tech. Bull. 88:1-180.
This publication is one of the most complete in existence on cutworms. It presents keys to eggs, first instar larvae, ultimate instar larvae, and pupae. It also discusses the distribution, food plants, larval behavior and food habits, seasonal history, and a description of the egg stage, all larval instars, and pupae, as well as parasites and predators recorded in the literature and observed in Tennessee. (90-94)

Crumb, S. E. 1932. The more important climbing cutworms. Bull. Brooklyn Entomol. Soc. 27:73-100.
The mature larva, the distribution, and the food plants of the dark-sided cutworm (*Euxoa messoria*) are discussed. Food plants listed are apple, grape, peach, and various shrubs. (82-83) Larva is figured Pl.X, C.

Davis, E. W. and H. E. Dorst. 1937. Noctuidae collected by light trap in central Utah. Proc. Utah Acad. Sci., Arts and Letters 14:179-194.
"1304 *messoria* Harris. 1929 August 20 to Sept. 6, 39 specimens. 1931 None. Peak of flight between Sept. 1 and 3." (182)

Dirks, C. O. 1937. Biological studies of Maine moths by light trap methods. Maine Agr. Exp. Sta. Bull. 389:33-162.
Food plants, geographical and seasonal distribution of *Euxoa messoria* are discussed. (72-73)

Doane, R. W. 1900. A new sugar beet pest, and other pests attacking the beet. Wash. Agr. Exp. Sta. Bull. 42:1-14.
The author describes the damage to sugar beets caused by larvae of *Carneades messoria* (=*Euxoa messoria*). These are dark, earth-colored larvae which feed sometimes upon the leaves of the plant, but more commonly on the upper portion of the root. Sometimes the roots are gnawed entirely in two; at other times large ugly-looking holes are made in the sides which, if made while the plant is young, either wholly destroy it or cause it to develop into a deformed ill-looking root. (12-13)

Dod, F. H. 1905. Preliminary list of the macro-lepidoptera of Alberta, N.W.T. Can. Entomol. 37:49-60.
The author states that *Euxoa messoria* and *Euxoa pleuritica*, Grote, can be separated by the fact that the former has a duller, grayer appearance and the secondaries are paler. (56) Although the author considers *Euxoa insulsa* Wlk. as a distinct species, this is considered a synonym (see Hardwick 1970). (58)
The author stated that specimens were sent to Sir George Hampson who replied, "What you send as *tessellata*, Harr., I should call a dark variety of *messoria*." (59)

Dod, F. H. 1918. Notes on Barnes and McDunnough's check list of lepidoptera of Boreal America. Can. Entomol. 59:8-16.
"*E. friabilis* Grt. stands as an aberration of *messoria*, which I believe to be correct. Dr. McDunnough and I studied the type together, and arrived at the same conclusion." *Friabilis* is now considered to be a synonym of *messoria* (see Hardwick 1970).

Dyar, H. G. 1902. A list of North American Lepidoptera and key to the literature of this order of insects. Bull. U. S. Nat. Mus. 52:1-723.
This article lists the synonomy of *Euxoa messoria* Harris as *spissa* Guenée, *cochrani* Riley, *repentis* Grote and Robinson, *displiciens* Walker, *reticens* Walker, *ordinata* Walker, *inextricata* Walker, *indirecta* Walker, *septentrionalis* Walker, *inducta* Walker. (144)

Dyar, H. G. 1904. The lepidoptera of the Kootenai District of British Columbia. Proc. U. S. Nat. Mus. 27(1376):779-938.
The author considered *Paragrotis pindar* Smith as a distinct species. This species is now considered a synonym of *messoria* (see Hardwick 1970).

Essig, E. O. 1926. Insects of western North America. McMillan Company. 1035 pp.
"The reaper dart *Euxoa messoria* (Harris) (Fig. 556, B) has a wing expanse of 35-40 mm. and is silvery gray with dark mottled fore wings. It is very common throughout the United States and is always abundant in the summer and fall along the Pacific Coast in California, Oregon, Washington, and British Columbia. The dull, pale green larvae attack wild grasses, weeds, and cultivated crops, and may be present in great numbers." (682)

Felt, E. P. 1904. Injurious insects. New York State Mus. Bull. 97:359-597.
"This dingy colored, stout caterpillar, about 1-1/4 inches in length, was the occasion of several complaints during the summer. It is a common frequenter of gardens and injures cabbages, potatoes, corn, and various other plants." (407)

Felt, E. P. 1905. Report of the state entomologist on injurious and other insects of the state of New York for 1904. 21:359-597.
The information reported in this publication is exactly the same as the previous citation (Felt 1904). (407)

Felt, E. P. 1907. Notes for the year. 22nd Report of the state entomologist on injurious and other insects of the state of New York:45-65.
The dark-sided cutworm was responsible for serious injury to primroses and other garden plants at Cold Springs Harbor, L. I., in late May, 1906. (53)

Felt, E. P. 1907. Twenty-second report of the state entomologist 1906. New York State Mus. Bull. 110:39-186.
The information reported in this publication is exactly the same as the previous citation (Felt 1907). (53)

Ferguson, D. C. 1954. The Lepidoptera of Nova Scotia. Proc. Nova Scotian Inst. Sci. 23(3):161-375.
"*E. messoria* Harr. Many records from White Point Beach and Digby north to Parrsboro, Springhill, and Stellarton, including less commonly form *atrifera* Grote. August 9 - Oct. 3 at light and bait. Often abundant, and probably one of the major cutworms." (223)

Ficht, G. A. 1940. Notes on Indiana Noctuidae. Proc. Indiana Acad. Sci. 49:243-253.
"*E. messoria* Harris. (1304) Dark-sided cutworm. A common and destructive species. DeKalb Co., July 12 - Oct. 19; Tippecanoe Co., July 3, 13, 31 (J.J.D.)." (244)

Fletcher, J. 1888. The president's annual address. Ont. Entomol. Soc. Annu. Rep. 19:1-91.
The larva and adult of *Agrotis cochranii* (=*Euxoa messoria*) are illustrated. (8)

Fletcher, J. 1893. Injurious insects of the year. Ont. Entomol. Soc. Annu. Rep. 24:1-111.
*Carneades* (=*Euxoa*) *messoria* was the most common species of cutworm in several districts. The larva and adult are illustrated. (9)

Fletcher, J. 1905. Insects injurious to Ontario crops in 1904. Entomol. Soc. Ontario 35:49-56.
In 1904 several species of cutworms caused a great amount of damage in Ontario. The most abundant was the red-backed cutworm which was accompanied by the dark-sided cutworm (*Paragrotis messoria*). (51)

Forbes, S. A. 1904. The more important insect injuries to Indian corn. Ill. Agr. Exp. Sta. Bull. 95:331-399.
The author describes and illustrates the larva and the adult. The common name of this cutworm (dark-sided) is due to the contrast of a dark stripe on each side with the ashy gray ground color. (362)

Forbes, S. A. 1905. The more important insect injuries to Indian corn. Twenty-third report of the state entomologist on the noxious and beneficial insects of the state of Illinois.:1-273.
This report is identical to the previous citation (Forbes 1904).

Forbes, W. T. M. 1954. Lepidoptera of New York and neighboring states. Part 3. Noctuidae. Cornell Univ. Agr. Exp. Sta. Mem. 329:1-433.
This publication includes keys to the subfamilies, genera, and species of noctuid moths. A detailed description of the adult is given, as well as a brief description of the larva. (39)

French, G. H. 1878. Lepidoptera. 7th Annu. Rep. State Entomol. Ill.:135-268.
The larva and adult of *Agrotis* (=*Euxoa*) *messoria*, the reaping rustic, are described and figured. (209-210)

French, G. H. 1878. Moths - Lepidoptera. 7th Annu. Rep. State Entomol. Ill.:79-106.
The author describes the dark-sided cutworm as the reaping rustic, *Agrotis* (=*Euxoa*) *messoria* Harris. Grote and Robinson had previously named the species *Agrotis repentis*. (92-93)

Frost, S. W. 1955. Cutworms of Pennsylvania. Penn. Agr. Exp. Sta. Bull. 596:1-29.
The author presents a field key to the common cutworms of Pennsylvania. (3-7)
He states that the dark-sided cutworm is especially injurious to vegetable crops but also attacks various grains and at times climbs trees and feeds upon buds. (22)

Garman, H. 1892. Some common pests of the farm and garden. Ky. Agr. Exp. Sta. Bull. 40:1-51.
The author discusses cutworms in general and their control (including *Agrotis* (=*Euxoa*) *messoria*). (21)

Gibson, A. 1912. Cutworms and armyworms. Can. Dep. Agr. Div. Entomol. Bull. 3:1-29.
This article discusses the appearance, habits, and life history of the common cutworms of Canada, including *Euxoa messoria*. The larva and adult are illustrated. (19-20)

Gibson, A. 1913. Reports on insects of the year. Division No. 1, Ottawa District. Entomol. Soc. Ontario. 43:11-17.
In light soils, cutworms were fairly abundant and in the early part of the season caused considerable damage in some fields. Young turnips, beets, radishes, cabbages, and cauliflowers were attacked by the red-backed and the dark-sided cutworms, the two common cutworms of the district. (12)

Gibson, A. 1915. Reports on insects of the year. Division No. 1, Ottawa District. Entomol. Soc. Ontario 45:13-16.
The dark-sided cutworm (*Euxoa messoria*) was numerous in the district in 1914 and ruined many young plants, particularly vegetables. (14)

Gibson, A. 1915. Cutworms and their control. Can. Dep. Agr. Entomol. Bull. 10:1-31.
This article is nearly identical to Gibson (1912) and describes the appearance, habits, and life history of the common cutworms of Canada.

Gibson, A. 1916. Reports on insects of the year. Division No. 1. Rep. Entomol. Soc. Ont. 1915. 46:11-14.
The dark-sided cutworm was one of the pests causing the most damage on vegetables and flowering garden plants. "The two species which effected most damage in the Ottawa district are the common striped cutworm (*Euxoa tesselata*)

and the dark-sided cutworm (*Euxoa messoria*), both of which were very abundant the previous season." (12)

Gibson, A. 1917. Cabbage insects. Annu. Rep. Quebec Soc. Protection Pl. from Insects and Fungous Disease. 1916-1917. 9:30-41.
The author discusses habits and control of cutworms attacking cabbages and other garden vegetables. Poisoned bran baits were recommended for control.

Gibson, A. 1917. Common garden insects and their control. Can. Dep. Agr., Entomol. Br. Circ. 9:1-20.
The dark-sided cutworm is one of the more regularly occurring species attacking garden vegetables and flowering plants. (8)

Gibson, A. 1923. Report of the Dominion entomologist for the two years 1919 and 1921. Canada Dep. Agr.:1-40.
"In 1919 specimens of the dark-sided cutworm were received from British Columbia. The cutworms were destructive in gardens, particularly in the district of Lillooct. Some of the larvae were affected by a bacterial disease. In this connection it is of interest to record the occurrence of the fungus *Entomophthora megasperum* Cohn in British Columbia, described in 1873, and never reported since. Diseased noctuid larvae were found by Mr. E. R. Buckell at Keremeos near Penticon. As they were found hanging from bushes, the larvae apparently cannot be considered to have been true cutworms."

Gillette, C. P. 1891. Notes and experiments upon injurious insects and insecticides. Iowa Agr. Exp. Sta. Bull. 12:535-549.
The author has reared *Agrotis* (=*Euxoa*) *messoria* from larvae collected around tomatoes, cabbages, beans, potatoes, peas, onions, radishes, turnips, sunflowers, and young grafts of apple, pear, plum, and cherry. (538-539)

Gossard, H. A. 1914. Report of the committee on entomology. Proc. Ohio State Hort. Soc. 47:103-110.
In 1913, the dark-sided cutworm caused severe damage to onions at Kenton, Ohio. These cutworms were said to have destroyed 30 acres of onions in 1 day. In 1887, this insect caused great destruction in Michigan, Illinois, and Indiana. It destroyed half of the onion crop of Orange, New Jersey, in 1885, 1887, and 1896. (109)

Gossard, H. A. 1917. Cutworms. Their habits, characteristics, and means of control. Mon. Bull. Ohio Agr. Exp. Sta. 2(3):85-90.
"The dark-sided cutworm (*Euxoa messoria*) is so called because of a broad dark stripe extending along each side, the general color of the remaining skin being ashy gray. The hairs arise from small, shining black tubercles." (87)

Grote, A. R. 1873. VII. A study of North American Noctuidae. Bull. Buffalo Soc. Nat. Sci. 1:95-128.
"*Agrotis repentis*, Grote and Robinson. Habitat, Atlantic District; Colorado Territory (coll. Theo. L. Mead, No. 33)." (96)

Grote, A. R. 1874. I. List of the Noctuidae of North America. Bull. Buffalo Soc. Nat. Sci. 2:1-54.
The author gives a key for separating the genera of *Agrotis, Hadena,* and *Mamestra*. (3) "*messoria* Harris, Ins. Inj. Veg. p. 444." (11)

Grote, A. R. 1874. Preliminary catalogue of the Noctuidae of California. Part II. Can. Entomol. 6:214-217.

"10. *Agrotis cochranii* Riley." Possible synonyms (*Agrotis lycarum* and *Agrotis* (=*Euxoa*) *messoria*) are mentioned and brief descriptions are given for the larva and moth. (214)

Grote, A. R. 1875. On new species of *Agrotis*. Can. Entomol. 7:186-188.
"*Agrotis friabilis, n.s.* A small species with a resemblance to *Bostoniensis*. All the tibiae spinose, the fore pair with larger terminal spinules; clypeus roughened. Fore wings fuscous gray, with indistinct darker markings. The t.p. line is lunulate; the t.a. line widely geminate and dentate; stigmata obsolete; median shade noticeable; terminal space more purely gray than the rest of the wing. Hind wings concolorous, pale grayish fuscous, above without line or spot; beneath (where they are whitish with the costal region powdered with fuscous) there is a faint median shading. Fore wings beneath with a faint median line distinctly marked in black on costa. *Expanse* 30 m.m. Taken by Mr. Geo. Norman; number 371." (187)

Grote, A. R. 1877. Notes on a collection of Canadian moths made by Wm. S.M. D'Urban, and named by F. Walker. Can. Entomol. 9(7):27-29.
The author considered *Agrotis spissa* Walker as a synonym of *Agrotis* (=*Euxoa*) *messoria*. (29)

Grote, A. R. 1878. Descriptions of Noctuidae chiefly from California. Bull. U. S. Geol. Surv. 4:169-187.
"*Agrotis atrifera,* n. sp.
♂♀.---All the tibiae spined. Male antennae simple, pubescent, with pairs of simple bristles on the joints. Allied to *choris*; of a grayish-fuscous; collar with a black central line; a black basal dash; a black dash before orbicular and between the ordinary spots. Stigmata concolorous; orbicular large, oblique, incomplete above; reniform subequal. T.p. line faint, double, tolerably even. S. t. line faint, near the margin, with some preceding black streaks. Hind wings whitish, with vague smokey borders, subpellucid. Beneath pale, whitish, powdery; traces of exterior shade on primaries; else the usual markings are obsolete. *Expansion*, 35 millimetres. Nos. 5201, California, and 4581, Sierra Nevada (from Mr. Henry Edwards)." (173)

Grote, A. R. 1881. Notes on *Agrotis repentis*. Papilio 1:126-128.
The author believed that *Agrotis repentis* was not synonomous with *Agrotis* (=*Euxoa*) *messoria*. He also states that *repentis* was redescribed as *Agrotis cochrani* (=*Euxoa messoria*) by Riley in the Missouri reports.

Grote, A. R. 1881. Preliminary list of the North American species of *Agrotis*, with descriptions. Bull. U. S. Geol. Surv. 6:149-164.
"Dr. Harris considers his *messoria* as the representative of the European *segetum*. This cannot be the case if, as is almost certain, *repentis* is this species of Dr. Harris's, too vaguely described to be readily recognized. It has been more recently redescribed by Mr. Riley as *Agrotis cochranii*." (150)

Grote, A. R. 1881. North American moths, with a preliminary catalogue of the species of Hadena and Polia. Bull. U. S. Geol. Surv. 6:257-277.
"*Agrotis atrifera* Grote, Bull. U. S. G. Surv. 4, 173. Both sexes of this species have been taken by Mrs. French at Orono, Me. The Maine specimens only seem to differ from my California types by the orbicular being complete and the black discal shade a little more extended. The female has the hind wings a little darker." (260)

Grote, A. R. 1882. Art. XIX. New moths, with partial catalogue of Noctuae. Bull. U. S. Geol. and Geog. Surv. Ter. 6:563-578. *Agrotis spissa* Guen. (=*Euxoa messoria*) Noct. 1, 261.
A description is given for the dark-sided cutworm moth. (566)

Grote, A. R. and C. T. Robinson. 1868. Descriptions of American Lepidoptera. Trans. Amer. Entomol. Soc. 1:323-351.
A detailed description of the moth of the dark-sided cutworm, *Agrotis repentis* (=*Euxoa messoria*), is given. (350-351)

Guenée, A. 1852. Species Général des Lépidoptéres. Noctuelites. 1:261.
A description is given (in French) of two moths of *Agrotis spissa* Gn. (=*Euxoa messoria*) which were collected by Boisduval in North America.

Gui, H. L. 1936. Cutworm control by sprays and dusts. 45th Annu. Rep. Ohio Agr. Exp. Sta.:48-49.
An outbreak of the dark-sided cutworm occurred in 1935 in Wayne County, Ohio, on muckgrown onions. Of nine different treatments, fewer insects remained on the plots dusted with lead arsenate, 1 lb.; lime, 2 lb.; and flour, 2 lb. (48-49)

Hampson, G. F. 1903. Catalogue of the Lepidoptera Phalaenae in the British Museum. Vol. 4:249, 256-257.
This article presents the synonomy of *Euxoa messoria* as of 1903. Descriptions are given of the larva and adult. The geographical distribution is given as reflected in locality records from the collection in the British Museum.

Hardwick, D. F. 1970. The genus *Euxoa* (Lepidoptera:Noctuidae) in North America. I. Subgenera *Orosagrotis, Longivesica, Chorizagrotis, Pleonectopoda,* and *Crassivesica.* Mem. Entomol. Soc. Can. 67:1-177.
The author gives a complete synonomy of the species, a description of the moth, male and female genetalia, and the deposition of the type specimens. The geographical distribution in Canada and the United States is given in great detail. (45-54)

Harris, C. R., G. F. Manson, and J. H. Mazurek. 1962. Development of insecticidal resistance by soil insects in Canada. J. Econ. Entomol. 55(5):777-780.
Tests on soil insects collected from a number of areas in Canada indicated that the dipterous insects are rapidly becoming resistant to the cyclodiene insecticides...The dark-sided cutworm, *Euxoa messoria* (Harris), was highly tolerant to dieldrin, DDT, and diazinon. Cyclodiene resistance has developed in areas where broadcast applications of insecticides have been applied to the soil over several consecutive years. It was suggested that, in order to slow the development of organophosphate resistance, procedures other than broadcast applications should be utilized with the organophosphate insecticides when feasible. (777)

Harris, C. R. and H. J. Svec. 1968. Toxicological studies on cutworms. I. Laboratory studies on the toxicity of insecticides to the dark-sided cutworm. J. Econ. Entomol. 61(5):788-793.
Laboratory tests indicated that several insecticides were more toxic than DDT as direct contact poisons to larvae of the dark-sided cutworm, *Euxoa messoria* (Harris). The larval instars showed a marked difference in tolerance to DDT and Dursban..., and became increasingly tolerant with each successive instar. Tests with emulsifiable concentrates applied to the soil surface indicated

that Dursban and Bayer 37289 (O-Ethyl O,2,4,5-trichlorophenyl ethylphosphonothioate) were effective at 1-2 lb. per acre, parathion and DDT only at 4 lb. per acre. Soil moisture influenced the toxicity of the emulsifiable concentrates, as did method of application...Rye treated with emulsifiable concentrates of DDT or Dursban proved to be a highly attractive bait, and the insecticides were from 4-8 times as toxic as soil treatments. The results suggested that several insecticides, which would not be effective as soil treatments, would provide highly effective cutworm control if attractive forms of bait could be developed. (788)

Harris, C. R., H. J. Svec, and W. W. Sans. 1968. Toxicological studies on cutworms. II. Field studies on the control of the dark-sided cutworm with soil insecticides. J. Econ. Entomol. 61(4):961-965.
Small scale field trials using microplots were conducted to assess effectiveness of soil treatments of DDT, Dursban, and Bayer 37289 (O-ethyl O-2,4,5-trichlorophenyl ethylphosphonothioate) against larvae of the dark-sided cutworm, *Euxoa messoria* (Harris), attacking flue-cured tobacco. DDT emulsifiable concentrate (EC) at 4 lb. per acre applied either as a soil-surface application or incorporated to a depth of 2 inches in the soil provided excellent control of the early instars. DDT-bran bait applied to the soil surface at 1 lb. per acre did not provide effective control. Dursban EC did not provide adequate control as a soil-surface application at 1 or 1.5 lb. per acre, but provided good control at 1 lb. per acre when incorporated into the soil. Bayer 37289 EC showed promise as a soil-surface application at 1.5 lb. per acre. (961)

Harris, C. R., H. J. Svec, and W. W. Sans. 1969. Toxicological studies on cutworms; V. Field studies on the control of the dark-sided cutworm by treatment of the rye crop grown in rotation with tobacco. J. Econ. Entomol. 62(6):1441-1444.
Microplot tests and large-scale field trials indicated that 1 lb. DDT, 1/4 lb. Dursban, and 1/2 lb. Bay 32789 (O-ethyl O-2,4,5-trichlorophenyl ethylphosphonothioate), applied to the rye crop 11 days prior to plowing it under, provided good control of *Euxoa messoria* (Harris) attacking flue-cured tobacco. The residues of insecticide on the rye disappeared rapidly by growth dilution and dissipation of the insecticide. DDT was most persistent > Bay 37289 > Dursban. From this and previous studies, it was concluded that a split application is necessary involving treatment of the rye crop in late April or early May, followed by a broadcast soil treatment 5-7 days before planting the tobacco. (1441)

Harris, C. R. and H. J. Svec. 1970. Toxicological studies on cutworms. VI. Laboratory studies on the toxicity of several experimental insecticides to the dark-sided cutworm as soil treatment and stomach poisons. J. Econ. Entomol. 63(2):605-609.
Laboratory tests indicated that larvae of *Euxoa messoria* (Harris) were highly tolerant to aldrin and chlordane both as soil and rye foliage applications. The toxicity of three experimental materials, phoxim, chlorphoxim, and Stauffer N-2596 (S-(p-chlorophenyl) O-ethyl ethylphosphonodithioate), to 4th and 5th instar cutworms was compared with results obtained with three standard insecticides, Bay 37289 (O-ethyl O-2,4,5-trichlorophenyl ethylphosphonothioate), DDT, and Dursban. In addition to Bay 37289 and Dursban, N-2596 and phoxim showed potential as soil insecticides to replace DDT. (605)

Harris, C. R. 1970. Laboratory evaluation of candidate materials as potential soil insecticides: III. J. Econ. Entomol. 63(3):782-787.

Thirteen insecticides were evaluated in the laboratory for their initial biological activity in soil and for persistence of biological activity under controlled laboratory conditions. First stage nymphs of a common field cricket, *Acheta* (=*Gryllus*) *pennsylvanicus* (Burmeister), an adult picture-winged fly, *Chaetopsis debilis* (Loew), and 3rd to 4th stage larvae of the dark-sided cutworm, *Euxoa messoria* (Harris), were used as test insects. Aldrin, diazinon, Dursban, DDT, and dieldrin were used as standard insecticides in the various tests. Four of the experimental materials, phoxim, chlorphoxim, Bay 80833 (O-3,4-dichlorophenyl O-methyl methylphosphonothioate), and N-2596 (S-(p-chlorophenyl) O-ethyl ethylphosphonodithioate) were effective broad-spectrum contact poisons and showed excellent activity in soil. All four were short-residual compounds similar in persistence to diazinon. Phoxim, chlorphoxim, and N-2596 were effective against cutworm larvae. (782)

Harris, C. R., H. J. Svec, and W. W. Sans. 1971. Toxicological studies on cutworms. VII. Microplot field experiments on the effectiveness of four experimental insecticides applied as rye cover crop and soil treatments for control of the dark-sided cutworm. J. Econ. Entomol. 64(2):493-496.
Microplot field trials were conducted to assess effectiveness of four insecticides applied to the rye cover crop and to soil against the larva of *Euxoa messoria* (Harris), which attacks flue-cured tobacco in southwestern Ontario. Under adverse conditions of moderately high temperature and low soil moisture, Dursban at 1/2 lb. and Bay 37289 (O-ethyl O-2,4,5-trichlorophenyl ethylphosphonothioate) at 1 lb. active ingredient (AI)/acre as rye treatments provided effective control. Stauffer N-2596 (S-(p-chlorophenyl) O-ethyl ethylphosphonodithioate) at 1/2 lb. and 1 lb. AI/acre was slightly less effective, while phoxim at 1/4 lb. and 1/2 lb. AI/acre was ineffective. (493)

Harris, C. R. and F. Gore. 1971. Toxicological studies on cutworms. VIII. Toxicity of three insecticides to the various stages in the development of the dark-sided cutworm. J. Econ. Entomol. 64(5):1049-1050.
Laboratory tests were conducted to determine the toxicity of three insecticides, DDT, Dursban, and Galecron, to the various stages in the life cycle of *Euxoa messoria* (Harris). The insecticides were applied topically using a Potter spray tower. The results indicated that DDT was effective against the early larval stages, but ineffective against the later larval stages, eggs, pupae, and adults. Dursban was effective against eggs, early larval stages, and adults, but ineffective against the later larval stages and pupae. Galecron was highly selective and was effective only against the eggs. (1049)

Harris, C. R. 1972. Factors influencing the biological activity of technical chlordane and some related components in soil. J. Econ. Entomol. 65(2):341-347.
A study was conducted to determine the factors moderating the insecticidal activity of technical chlordane in soil. Both chlordane and aldrin were ineffective against 3rd stage larvae of the dark-sided cutworm, *Euxoa messoria* (Harris). Soil type was the major factor influencing the biological activity of chlordane and in moist soils toxicity was negatively correlated with organic content. Soil moisture was a factor of secondary importance. (341)

Harris, C. R. 1972. Factors influencing the effectiveness of soil insecticides. Annu. Rev. Entomol. 17:177-198.
The author discusses the various factors which influence the effectiveness of insecticides in the soil. Not only do different species of cutworms vary widely in their tolerance to insecticides, but the different instars of a single species also vary widely in insecticidal tolerance. The relative tolerances of

the dark-sided cutworm, the black cutworm, the variegated cutworm, and the red-backed cutworm to insecticides are discussed. (188-190)

Harris, C. R., H. J. Svec, and W. W. Sans. 1973. Toxicological studies on cutworms. IX. Laboratory and microplot field studies on effectiveness and persistence of some experimental insecticides used for control of the dark-sided cutworm. J. Econ. Entomol. 66(1):199-203.
Laboratory and field microplot studies were conducted to assess the effectiveness of 20 insecticides against *Euxoa messoria* (Harris) attacking flue-cured tobacco. Primary screening tests in the laboratory indicated that 6 of 19 insecticides were equally or more effective by direct contact than DDT, but all were less effective than chlorpyritos. Secondary screening tests conducted in the laboratory on three of these insecticides, Bay 77049 (O,O-diethyl O-(2-chinoxalyl) phosphorothioate), Biothion (O,O'-thiodi-p-phenylene) O,O,O',O'-tetramethyl phosphorothioate), and leptophos, indicated that all were effective as soil and/or stomach poisons. (199)

Harris, T. W. 1841. Report on the insects of Massachusetts injurious to vegetation. Folsom, Wells, and Thurston, Cambridge, Mass. 459 pp.
"The reaping rustic (*Agrotis messoria*), as it may be called, is the representative of the corn-rustic (*Agrotis segetum*) of Europe." The original description of the moth is given on page 324.

Harris, T. W. 1842. A treatise on some of the insects of New England which are injurious to vegetation. Insects of Mass. 459 pp.
This information is the same as that in the preceding citation.

Harris, T. W. 1862. A treatise on some of the insects injurious to vegetation. 3rd ed. Boston, Mass. 640 pp.
This is the same article as the one published in 1842.

Hart, C. A. 1903. Synopsis of insect collections for distribution to Illinois high schools, Lepidoptera (butterflies and moths). Illinois State Laboratory of Natural History.:7-64.
"121. *Paragrotis messoria* Harr. (*Agrotis, Carneades*). Reaping Owlet; l., Dark-sided cutworm. F., garden vegetables and fruit trees. H. probably as larvae, which become most evident in May; enter earth and remain a time in earthen cells, then pupate; I, July to end of Sept. Larva is a "climbing cutworm." Ground color uniform; transverse lines double these and discal spots well-marked; no evident W-mark in line 4." (32)

Hawkins, J. H. 1930. Tarsal claws of Noctuid larvae. Ann. Entomol. Soc. Amer. 23:393-396.
The larval tarsal claw of *Euxoa messoria* is figured. (394) A table of ratios of parts of tarsal claws is given on page 396.

Herrick, G. W. 1926. Some long-standing and some more recent insect pests with hints on methods of control. Proc. Annu. Meet. N. Y. State Hort. Soc., 71:4-17.
The cutworms, *Agrotis ypsilon*, Rott., and *Euxoa messoria*, Harr., attacking lettuce were controlled with a bait consisting of 20 lb. bran, 1-1/2 lb. lead arsenate or 1 lb. Paris green, 2 or 3 lemons, 2 qts. molasses, and sufficient water to make a soft bait. (10-11)

Hewitt, C. G. 1915. Report of the Dominion entomologist for the year ending March 31, 1915. Can. Dep. Agr.:5-39.

"From British Columbia specimens of the dark-sided cutworm, *Euxoa messoria* Harr., were received. The cutworms were destructive in gardens, particularly in the district of Lillooet. Some of the larvae were affected by a bacterial disease." (8)

Hewitt, C. G. 1917. Report of the Dominion entomologist for the year ending March 31, 1916. (Can. Dep. Agr.:1-70) Rev. Appl. Entomol. 5:331.
The dark-sided cutworm was very abundant and was destroying young beets, carrots, onions, and tobacco plants.

Hinks, C. F. and J. R. Byers. 1973. Characters for determining the sex of cutworms and other noctuid larvae (Lepidoptera:Noctuidae). Can. J. Zool. 51(12):1235-1241.
External structures were found which permitted the accurate determination of males or females, or both, in the larvae of each of 40 species of noctuids. In *Euxoa messoria*, the male larvae were most easily determined by a distinct, melanized invagination in the region of Herold's organ. (1235, 1239)

Holland, W. J. 1968. The moth book. A guide to the moths of North America. Dover Publications, Inc., New York. Dover edition. 479 pp.
"(8) *Euxoa messoria* Harris Plate XXII, Fig. 40. ♂ . (The Reaper Dart). Syn. *spissa* Guenée; *cochrani* Riley; *repentis* Grote and Robinson; *displiciens* Walker, etc. This wretched little creature, the larva of which is one of our most destructive cutworms, was described seven times by Walker under different names." (188-189)

Huber, L. L. 1938. Poison bran mash for cutworm control in corn. Ohio Agr. Exp. Sta. Bull. 592:44.
The author describes experiments made with poison baits for control of *E. messoria*. Dry baits gave 94% control as compared with 96% for wet baits containing Paris green. Baits containing oil were much less attractive than those moistened with water.

Hudon, M. and P. Martel. 1973. Les insectes des cultures maraîchères dans le sud-ouest du Québec en 1972. Ann. Entomol. Soc. Quebec. 18(1):3-4.
The principal species of cutworms which attack commercial vegetable plantings in Quebec are the red-backed cutworm, the black cutworm, the spotted cutworm, the striped cutworm, the bronzed cutworm, and the dark-sided cutworm.

King, J. M. 1929. Insects affecting field crops and gardens in Saskatchewan, 1922-1927. Sci. Agr. 9(6):373-390.
*Euxoa messoria* which was abundant in eastern Manitoba in 1926 has not been encountered here in economic numbers during the past 6 years. (381)

Knowlton, G. F., W. J. Hanson and T. L. Whitworth. 1974. Investigation of the Noctuidae (Lepidoptera) in Curlew Valley. Proc. Utah Acad. Sci., Arts and Letters. 51(1):45-49.
"*E. messoria* (Harr.) Kelton, Utah, Aug. 31."

Knutson, H. 1944. Minnesota Phalaenidae (Noctuidae). The seasonal history and economic importance of the more common and destructive species. Minn. Agr. Exp. Sta. Tech. Bull. 165:1-128.
This bulletin includes a discussion of the economic importance and seasonal history of common noctuids in Minnesota. In this state, light trap records indicate one generation per year of the dark-sided cutworm, with adults taken

mainly in late July, August, and early September. *E. messoria* attacks a wide variety of plants and often assumes the climbing habit. (18-19)

Lacroix, D. S. 1935. Insect pests of growing tobacco in Connecticut. Conn. Agr. Exp. Sta. Bull. 379:88-130.
The appearance and habits, the food plants, and the distribution of the dark-sided cutworm are discussed. Figures showing the larva and the adult of the dark-sided cutworm are given. (97-98)

Lange, W. H., Jr. 1941. The artichoke plume moth and other pests injurious to the globe artichoke. Calif. Exp. Sta. Bull. 653:1-71.
Dark-sided cutworm larvae (*Euxoa messoria*) were found feeding on artichoke and may occasionally become pests. (56)

Lange, W. H., Jr., S. F. Bailey, and J. P. Underhill. 1958. Cutworms on white asparagus. (Calif. Agr. 12(4):13-14). Rev. Appl. Entomol. 48:181.
"*Euxoa messoria* (Harris), which is widely distributed in the United States, causes economic damage to asparagus in the delta area of central California every year. The larvae feed at night on the tender tips and sometimes on the leaves, and damage 15-40 percent of the shoots. The eggs are apparently laid in cultivated fields, and some hatch in the same year, whereas others probably overwinter in the soil. Larvae overwinter under debris or rocks, damage asparagus between April and mid-June and pupate in July; the adults emerge between July and the autumn." (181)

Leonard, M. D. 1928. A list of the insects of New York. Cornell Univ. Agr. Exp. Sta. Mem. 101:1-1121.
"1304 *E. messoria* Harr. DARK-SIDED CUTWORM. This and the following four species are not determinable without dissection, and the records are therefore tentative. Typical *messoria* is generally common, and an important cutworm. Jl-Sep." (663)

Lintner, J. A. 1888. Cut=worms. New York State Mus. Bull. 6:1-36.
The larva and moth of the dark-sided cutworm, *Agrotis* (=*Euxoa*) *messoria* Harris, are figured. (13)

Lockhead, W. 1919. Class book of economic entomology. P. Blakiston's Son and Co., Philadelphia. 436 pp.
The larva of *Euxoa messoria* is described. It is active in May and June on fruits and garden vegetables. (187)

Marten, J. 1880. Noctuidae. (Owlet Moths). Ill. Dept. Agr. Trans. 18 Append.: 128-140.
The larva of *Agrotis* (=*Euxoa*) *messoria* is described and the larva and the adult are illustrated.
"This larva possesses the climbing habit of the climbing rustic, and may be found in the ground, among cabbages, potato hills, in corn fields and flower gardens." (134)

McDunnough, J. 1927. The lepidoptera of the Seton Lake region, British Columbia. Can. Entomol. 59:193-200.
"*Euxoa messoria* Harris. Two ♂, June 25, July 14."

McDunnough, J. 1938. Check list of the Lepidoptera of Canada and the United States of America. Mem. S. Calif. Acad. Sci. Part 1.:1-275.
This publication lists the macrolepidoptera of the United States and Canada. Synonyms listed were as follows: "1310 *messoria* Harr., *spissa* Gn., *inextricata*

Wlk., *indirecta* Wlk., *displiciens* Wlk., *expulsa* Wlk., *ordinata* Wlk., *reticens* Wlk., *cochrani* Riley, *repentis* G. & R., *confracta* Morr., ab. *friabilis* Grt., a *territorialis* Sm., *fulda* Sm., form *atrifera* Grt., *pindar* Sm." (59)

McDunnough, J. 1950. Species of *Euxoa* of eastern North America, with particular reference to genitalic characters (Lepidoptera, Phalaenidae). Bull. Amer. Mus. Nat. Hist. 95:359-408.
The author summarizes the synonomy as of 1950, gives detailed description of the male and female genetalia and the disposition of the holotypes. (376-378)

Metcalf, C. L., W. P. Flint, and R. L. Metcalf. 1962. Destructive and useful insects. McGraw-Hill Book Company, Inc., New York. 1087 pp.
There are two groups of cutworms which attack tobacco. The first group has three to four generations per year while the other group, including the dark-sided cutworm, has only one generation per year. The latter group includes species which lay their eggs chiefly in weedy or grassy fields in late summer or fall. The eggs hatch and the larvae spend the winter partly grown and feed destructively upon the newly set plants in the spring. (594-595)

Mitchener, A. V. 1928. Optimum feeding temperatures for the dark-sided cutworm, *Euxoa messoria*, Harris. Sci. Agr. 8(6):370-375.
In Manitoba, the maximum damage done by the dark-sided cutworm occurs about the first week in June. Until near the end of May, the higher the temperature within natural limits, the more the cutworms eat. Beginning near the end of May and continuing into June, the optimum feeding temperatures dropped to the range 20° C. to 25° C. (68° F. to 77° F.). Cutworms which have fed upon Paris green poisoned baits stop feeding but do not die for several days. (375)

Moore, S. 1955. An annotated list of the moths of Michigan exclusive of the Tineoidea (Lepidoptera). Univ. Mich. Misc. Pub. 88:1-87.
Michigan county records of *Euxoa messoria* are given. (14)

Morrill, A. W., Jr. and D. S. Lacroix. 1938. Report on the insect investigations for the 1937 season. Conn. Agr. Exp. Sta. Bull. 410:444-449.
Cutworms, *Euxoa messoria* (Harris), were important pests of tobacco in many sections of Connecticut, particularly where no poison bran bait was used at setting time. (448)

Morrill, A. W., Jr. 1942. Insect damage to tobacco in the Connecticut River Valley. J. Econ. Entomol. 35(1):60-62.
The dark-sided cutworm (*Euxoa messoria*) was among the pests causing damage to mature tobacco leaves. Cutworm damage, although severe in a few fields, was of little importance for the area as a whole. "Damage by cutworms is lessened by the widespread use of poisoned baits, and wherever these baits are not used severe injury almost invariably follows." (61)

Osborn, H. 1891. Annual address of the president. Can. Entomol. 23:211-222.
Following the presidential address by Herbert Osborn at the annual meeting, Mr. Lintner described a destructive cutworm believed to be *Euxoa messoria*. However, the reared imago proved to be *Agrotis ipsilon*. (220)

Packard, A. S. 1869. Guide to the study of insects and a treatise on those injurious and beneficial to crops for the use of colleges, farm-schools, and agriculturalists. Henry Holt and Co., New York. 715 pp.
The larva and adult *Agrotis cochrani* (=*Euxoa messoria*) are described and illustrated. (308-309)

Packard, A. S. 1881. Half hours with insects. Estes and Lauriat, Boston. 384 pp.
*Agrotis cochrani* (=*Euxoa messoria*) climbs pear and apple trees and grape vines and eats the fruit buds. The larva and adult are illustrated. (23-24)

Peairs, L. M. 1946. Insect pests of farm, garden, and orchard. John Wiley & Sons, Inc., N. Y. 549 pp.
The adult *Euxoa messoria* is illustrated. (113)

Perkins, G. H. 1894. Report of the entomologist. Vermont Agr. Exp. Sta. Annu. Rep. 7:1-151.
"This *Carneades messoria* Harr. (*Agrotis messoria*, Authors) is one of the climbing cutworms and, like others of its kind, not infrequently does much damage to fruit." It is a widely distributed species. The moth is illustrated. (141)

Pettit, R. H. 1926. Report of the section of entomology. Annu. Rep. State Bd. Agr. Mich. 65:261-291.
The dark-sided cutworm, *Euxoa messoria*, proved to be causing most of the cutworm damage to garden truck crops. Mint fields in the vicinity of St. Johns, Mich., suffered severely. (280)

Riley, C. V. 1867. A chapter on cutworms. Prairie Farmer 35:413-414. (Jun. 22, 1867).
The author describes and figures the larva and adult of *Agrotis cochranis* (Riley) [=*Euxoa messoria* (Harris)]. (414)

Riley, C. V. 1869. Cutworms. (Lepidoptera:Noctuidae). The natural history of twelve distinct species. 1st Annu. Rep. on the noxious, beneficial, and other insects of the State of Missouri.:67-91.
The larva and adult of the Cochran rustic, *Agrotis cochranii* Riley (=*Euxoa messoria*) are illustrated and described. The climbing and feeding behavior of the larvae on fruit trees are also described. (74-75)

Riley, C. V. 1881. Descriptions of new species and varieties. Lepidoptera. Gen. Index and Suppl. to the Nine Reps. on the Insects of Mo. Bull. 6:72-84.
*Agrotis cochranii=Agrotis* (=*Euxoa*) *messoria* and *A. repentis* and *A. lycarum* are also considered synonyms. The adult, larva, and pupa are described. (76-77)

Riley, C. V. 1882. The Noctuidae in the Missouri entomological reports. Papilio 2:41-44.
The author states there is little question but that *A. cochranii* and *A.* (=*Euxoa*) *messoria* are the same species. (41)

Riley, C. V. 1883. General notes. Amer. Naturalist 17:422.
The larva and moth of *Agrotis* (=*Euxoa*) *messoria* Harris are figured and described. The author disagreed with A. R. Grote's theory that *Agrotis* (=*Euxoa*) *messoria* Harris is synonomous with *Agrotis scandens* Riley.

Riley, C. V. 1885. Report of the entomologist. Annu. Rep. U. S. Comm. Agr. 1884: 285-418.
The larva and moth of *Agrotis* (=*Euxoa*) *messoria* are figured (Plate 2; Fig. 6). The author also described the climbing and feeding behavior of the larvae on fruit trees. The larvae have a preference for blossom buds and when these are all eaten, the larvae then attack the leaf buds. (290-291)

Riley, C. V. 1886. Report of the entomologist. Annu. Rep. U. S. Comm. Agr. 1885: 207-343.

The habits and natural history of the dark-sided cutworm are discussed and the larva and moth are figured (Plate VII; Fig. 1). The author reports that this species was destroying the onion crop in his vicinity and threatened to eliminate a large and growing industry estimated to be worth $500,000. (270-272) Preventive measures recommended were to treat the fields in early spring with a mixture of lime and ashes. After the seed is sown, if cutworms threaten damage, baits consisting of fresh cut grasses treated with Paris green should be put out. (272)

Rindge, F. H. 1955. The type material in the J. B. Smith and G. D. Hulst collections of Lepidoptera in the American Museum of Natural History. Bull. Amer. Mus. Nat. Hist. 106:95-172.
"*territorialis* Smith, *Carneades* 1900, Proc. U. S. Natl. Mus., vol. 22, p. 436. Cotype male, Salida, Colorado, 7-10-1898." (133)

Saunders, W. 1883. Insects injurious to fruits. J. B. Lippincott & Co., Philadelphia. 436 pp.
The dark-sided cutworm, *Agrotis cochranii* Riley, (=*Euxoa messoria*) is another of the climbing species. The larva and moth are figured and described. (107)

Saunders, W. 1904. Insects injurious to fruits. J. B. Lippincott & Co., Philadelphia. 436 pp.
This publication is the same as the previous citation.

Schaffner, J. V., Jr. and C. L. Griswold. 1934. Macrolepidoptera and their parasites reared from field collections in the northeastern part of the United States. U. S. Dep. Agr. Misc. Pub. 188:1-160.
"*Euxoa messoria* Harr. Food plants: Garden crops. (A cutworm.) Occurrence: collections from Dover, Mass., and East Hartford, Conn. Totals received: collections, 2; larvae, 8; years, 2. Larvae: collected in May and June. Pupae: late June and July. Adults: August." (42)

Shaw, F. R. and R. J. Lavigne. 1959. Insects in relation to forage crops in Massachusetts. Mass. Agr. Exp. Sta. Bull. 509:1-68.
In 1958, cutworms, primarily *Euxoa messoria* (Harris), and the clover leaf weevil were more numerous than usual. (33)

Slingerland, M. Y. and C. R. Crosby. 1915. Manual of fruit insects. MacMillan Co., N. Y. 503 pp.
The dark-sided cutworm, *Paragrotis* (=*Euxoa*) *messoria* (Harris), is listed as one of a dozen different kinds of climbing cutworms. The life history and control of climbing cutworms in general is discussed. (139)

Smith, J. B. 1890. Contribution toward a monograph of the insects of the lepidoptera family Noctuidae of temperate North America. Revision of the species of the genus *Agrotis*. Bull. U. S. Nat. Mus. 38:1-237.
The author lists 20 references giving the synonomy of *Carneades* (=*Euxoa*) *messoria*. The geographical distribution is cited as from Atlantic to Pacific, and from Canada to the southern United States. Grote's translation of *Carneades spissa* Guenée is also given. (169-170)

Smith, J. B. 1891. Notes on some species of Noctuidae described by Francis Walker. Can. Entomol. 23:117-121.
Four synonyms for *Carneades* (=*Euxoa*) *messoria* are given; *Agrotis reticens* Wlk., *Agrotis inordinata* Wlk., *Agrotis inextricata* Wlk., and *Agrotis indirecta* Wlk. (119-120)

Smith, J. B. 1892. Report of the entomologist. N. J. Agr. Exp. Sta. Annu. Rep. 13:389-512.
"This species, which is represented at Figure 33, a, is a well-known one, with a bad reputation for injury done on a large variety of crops. I have myself observed it in New York State in onion fields in such enormous numbers that acres of onions were utterly destroyed...The eggs are laid by the moths toward the end of summer, and hatch soon afterward. The larvae or young cutworms develop slowly, and become little more than half grown in fall...In early spring they revive with the vegetation, and begin feeding with immense appetite. When the land is prepared for planting, the larvae and their food are both turned under; but through the loose soil they make their way to the surface without much difficulty. Their food is all buried, and they are compelled to bear hunger until new vegetation starts or a new crop is set out. As soon as the latter happens the hungry cutworms attack it, and I have seen half of a large field of early cabbages destroyed by them in a single night." (470-471)

Smith, J. B. 1893. Catalogue of the Lepidopterous superfamily Noctuidae found in Boreal America. U. S. Nat. Mus. Bull. 44:96-97.
There are 34 references for the dark-sided cutworm listed which largely reflect the synonomy of the species to date.

Smith, J. B. 1895. Seventh annual meeting of the association of economic entomologists. Ont. Entomol. Soc. Annu. Rep. 26:1-102.
The larva and moth of *Carneades* (=*Euxoa*) *messoria* are figured. This species has the habit of climbing and feeding on the tops of onions. (76)

Smith, J. B. 1899. Insects of New Jersey. A list of the species occurring in New Jersey with notes on those of economic importance. Supp. 27th Annu. Rep. State Bd. Agr.:410.
"*C. messoria* Harris. Common throughout the state June to September. The larva is the most injurious of the cutworms in South Jersey, especially on sweet potatoes."

Smith, J. B. 1900. A hundred new moths of the family Noctuidae. Proc. U. S. Nat. Mus. 22:413-495.
Appearance and habitat of the dark-sided cutworm, *Carneades fulda* n. sp. (=*Euxoa messoria*) are discussed. (437-438)

Smith, J. B. 1904. Remarks on the catalogue of the Noctuidae in the collection of the British Museum. J. New York Entomol. Soc. 12:93-104.
The author considered *Euxoa expulsa* Smith as a distinct species. This species is now considered a synonym of *Euxoa messoria*. (98) (See Hardwick 1970)

Smith, J. B. 1906. Economic entomology. J. B. Lippincott & Co., Philadelphia. 475 pp.
The collection, habits, and control of cutworms are discussed. The larva and adult *Carneades* (=*Euxoa*) *messoria* are illustrated. (290-294)

Smith, J. B. 1907. Notes on some American Noctuids in the British Museum. J. New York Entomol. Soc. 15:141-162.
Hampson referred the species *Euxoa insulsa* Wlk. to *messoria* in his catalogue and Smith took the liberty of doubting the reference. Re-examination of the type proves that the original reference was correct and that *insulsa* has nothing to do with *messoria*. (142)

Smith, J. B. 1910. Insects injurious to sweet potatoes in New Jersey. New Jersey Agr. Exp. Sta. Bull. 229:1-16.
The larva of *Euxoa messoria* was the most common cutworm attacking sweet potatoes in New Jersey. The larvae cut off the plants close to the surface and chewed out the heart of the sweet potato. (12-13)

Specht, H. B. 1973. Dark-sided cutworm (*Euxoa messoria* Harr.) control with baits in cabbage and fluecured tobacco. Annu. Rep. Can. Dep. Agr. Res. Sta.:1-116.
Bait was scattered along the rows at the bases of tobacco and cabbage plants at the rate of approximately 20 lb. per acre June 26, 1973, shortly after damage was first noted. Treatments were replicated three times on five consecutive rows and each row contained 20 plants. Plant injuries and cutworms were counted July 6, 1973. None of the baits effectively controlled cutworms when they were applied at the time damage occurred. (61)

Specht, H. B. 1973. Control of cutworms in tobacco. Dark-sided cutworm, *Euxoa messoria* Harr; variegated cutworm, *Peridroma saucia*; black cutworm, *Agrotis ipsilon*. Annu. Rep. Can. Dep. Agr. Res. Sta.:1-116.
Treatments were applied to two Somerset sandy loam tobacco fields in rye the previous year. Each plot consisted of 3,000 plants of Hicks broadleaf tobacco in 17 325-ft. rows. Supracide 2 lb. A.I./acre, N-2596 1/2 lb. A.I./acre and N-2596 2 lb. A.I./acre were as effective as Phosvel 1/2 lb. A.I./acre for the control of dark-sided cutworms. (61)

Symons, T. B. 1905. The common injurious and beneficial insects of Maryland. Md. Agr. Exp. Sta. Bull. 101:125-204.
The dark-sided cutworm caused severe injury to potatoes and sweet potatoes in Maryland. (176)

Tietz, H. M. 1951. The Lepidoptera of Pennsylvania. A manual. Penn. Agr. Exp. Sta.:1-194.
There are nine references listed for the dark-sided cutworm (*Euxoa messoria*). Collection records and dates are given for Pennsylvania. A list of the recorded food plants is given. (50)

Tietz, H. M. 1972. An index to the described life histories, early stages, and hosts of the macrolepidoptera of the continental United States and Canada. Allyn Museum of Entomology, Sarasota, Fla. 1041 pp.
This two-volume work lists the approved common names of moths and butterflies, a bibliography and host range for each species, as well as a short synonomy of the scientific names of the species. The last section lists the scientific and common names of plant hosts and then lists the lepidoptera which have been reported to feed upon these hosts. (435-436)

Todd, E. L. 1968. Selection of lectotypes for some species of *Euxoa* Hübner described by J. B. Smith. Proc. Entomol. Wash. 70(3):263-280.
The author designated ♀ type USNM type number 4793 as the lectotype of *Carneades territorialis* Smith. (279) (Hardwicke later referred this to synonomy with *Euxoa messoria*).

Treherne, R. A. 1919. Insect notes of the year 1918. Dep. Agr. J. 3(11-12):258, 281, and 301. Rev. Appl. Entomol. 6:170-171.
Cutworms (*Euxoa messoria*) were plentiful in 1918 in British Columbia. (171)

Tseng, Sheng. 1943. A comparative study on the morphology of cutworms, Part I. External morphology. 41-56. (Sine loco. 1943). Rev. Appl. Entomol. 34:116. Details are given of the external morphology of the larvae of *Euxoa messoria* (the dark-sided cutworm), which is one of the four cutworms known to be injurious in China.

## United States Department of Agriculture Cooperative Economic Insect Report[1]

The Bureau of Entomology of the U. S. Department of Agriculture, in cooperation with the State Entomologists, Entomologists of the Agricultural Experiment Stations, State Departments of Agriculture, Agricultural Colleges, and other entomological agencies, organized an Insect Pest survey in 1921. This survey attempted to assemble and disseminate all data on the distribution, seasonal and regional fluctuation of insect abundance, weather data as related to insect outbreaks, phenological data, and other miscellaneous information. Each year an annual digest of the important facts gathered during the past season was published in the form of Insect Pest Summaries.

From 1921 to 1950, this publication was entitled "The Insect Pest Survey Bulletin." This was not bound or indexed for the years 1942-1949. In 1951, the Bulletin was replaced by the "Cooperative Economic Insect Report," Vol. 1., No. 1, July 31, 1951. No explanation is given in this publication for the name change.

Since these references are too numerous to list separately, they are listed by years.

1921. U.S.D.A. Insect Pest Surv. Bull. 1:129.
S. R. Crosby and assistants (June 19) reported serious injury by the dark-sided cutworm, *Euxoa messoria* (Harris), in small areas in Orange County, N. Y. Damage ceased after the dark-sided cutworm destroyed several acres at Williamson, N. Y.

1925. U.S.D.A. Insect Pest Surv. Bull. 5:157.
The period of heaviest injury was May 27 to June 9, and although more or less cutting of corn took place over practically the whole state of Nebraska, injury was especially severe in the cornfields of the sandhill region, where the dark-sided cutworm, *Euxoa messoria* (Harris), was apparently the principal offender.

1927. U.S.D.A. Insect Pest Surv. Bull. 7:142, 145.
In Nebraska, large numbers of young dark-sided cutworms were causing injury to alfalfa. During May, the dark-sided cutworms continued their development on alfalfa. (142) *Euxoa messoria* (Harris) was one of the prominent species to cause injury to alfalfa and corn in Nebraska. (145)

1929. U.S.D.A. Insect Pest Surv. Bull. 9:166.
Cutworm infestations extended over southeastern South Dakota, southwestern Minnesota, and northeastern Iowa in both garden and field crops. A lot of 150 larvae submitted for identification showed *Euxoa messoria* (Harris) to be the dominant form present.

[1] Issued by Plant Protection and Quarantine Programs, Animal and Plant Health Inspection Service, U. S. Department of Agriculture.

1930. U.S.D.A. Insect Pest Surv. Bull. 10:85.
Cutworms were very abundant on garden plants, young strawberry plants, and flowers in Oregon.

1931. U.S.D.A. Insect Pest Surv. Bull. 11:246.
In Massachusetts, in late May and early June, there was reported a rather severe infestation of cutworms attacking strawberry beds in the Cape section in Barnstable County. Prof. Whitcomb reported that it was probably the dark-sided cutworm, *Euxoa messoria* (Harris), although it was not definitely determined.

1932. U.S.D.A. Insect Pest Surv. Bull. 12:79,82-83,416.
Alfalfa was seriously damaged over a large area in east central Nebraska by *Euxoa messoria* (Harris). (79) Farmers in east central Nebraska reported serious damage to alfalfa by the dark-sided cutworm, *Euxoa messoria* (Harris). (82) The dark-sided cutworm, *Euxoa messoria* (Harris), caused serious damage to alfalfa in east central Nebraska. (416)

1933. U.S.D.A. Insect Pest Surv. Bull. 13:150.
A complaint concerning damage in alfalfa by the dark-sided cutworm (*Euxoa messoria* Harr.) was received on June 3 from Perkins County, Nebraska.

1936. U.S.D.A. Insect Pest Surv. Bull. 16:165.
The dark-sided cutworm, *Euxoa messoria* (Harris), was found to be injuring tomato plants in Lancaster County and potatoes in Knox County, Nebraska.

1938. U.S.D.A. Insect Pest Surv. Bull. 18:145, 247.
The dark-sided cutworm, *Euxoa messoria* (Harris), was one of the species reported to be most destructive in Connecticut. (145) Moths of the dark-sided cutworm were not noted until June 10 and then were moderately abundant in Nebraska. (247)

1940. U.S.D.A. Insect Pest Surv. Bull. 20:50.
Reports of cutworms from Anadarko and Lawton, southwestern Oklahoma, and from Stillwater in north-central Oklahoma which were injuring wheat and barley have tentatively identified them as *Euxoa messoria* (Harris).

1941. U.S.D.A. Insect Pest Surv. Bull. 21:568.
There was a heavy flight of the dark-sided cutworm moths, *Euxoa messoria* (Harris), at Augusta, Maine.

1953. Coop. Econ. Insect Rep. 3:154.
Cutworms were scattered throughout the southern half of Minnesota. A special survey indicated that the heaviest concentrations of cutworms were found feeding on flax in the south central and southwestern part of the state. The dark-sided cutworm was the most abundant collected in the survey.

1960. Coop. Econ. Insect Rep. 10:454.
Very light infestations of *Euxoa messoria* were found in Box Butte County, Nebraska.

1961. Coop. Econ. Insect Rep. 11:105, 475, 497.
A very light infestation of *Euxoa messoria* was found in wheat in Box Butte County, Nebraska, in mid-May. (105) *Euxoa messoria* was damaging alfalfa in Perkins County, Nebraska. (475) *Euxoa messoria* was causing damage to corn and sugar beets in the panhandle area of Nebraska. (497)

1962. Coop. Econ. Insect Rep. 12:124, 154, 219, 1175.
*Euxoa messoria* caused damage to corn in the panhandle area of Nebraska during the first week of June. (124) *Euxoa messoria* caused damage to alfalfa in the southwestern part of Nebraska during the first week of June. (154) *Euxoa messoria* damaged sugar beets in the panhandle area of Nebraska during the first week of June. (219) In Ontario, *Euxoa messoria* severely damaged flue-cured tobacco. (1175)

1963. Coop. Econ. Insect Rep. 13:480, 1401.
Low populations of *Euxoa messoria* were found in alfalfa in Lincoln County, Nebraska (480). In Ontario, *Euxoa messoria* severely damaged tobacco and in Norfolk County, Ontario, *Euxoa messoria* injured corn. (1401)

1964. Coop. Econ. Insect Rep. 14:161.
*Euxoa messoria* was very light on alfalfa in Lincoln County, Nebraska, in early May. (161)

1965. Coop. Econ. Insect Rep. 15:750.
Specimens collected from alfalfa May 17 at Charlestown, Sullivan County, N. H., were determined as *Euxoa messoria*. (750)

1966. Coop. Econ. Insect Rep. 16:56, 390, 478, 536, 629, 642.
In southwestern Ontario, *Euxoa messoria* severely damaged tobacco and strawberry. (56) In Poughkeepsie, N. Y., there were heavy trap catches of *Euxoa messoria* in late summer. (390) *Euxoa messoria* (probably) was very abundant on weeds in sweet corn at New Paltz, Ulster County, N. Y. (478) *Euxoa messoria* was common in fields and gardens in the Hudson Valley area of New York, causing superficial damage to sweet corn. (536) *Euxoa messoria* caused considerable damage to corn in Bedford County, Pa. (629) *Euxoa messoria* was found to be damaging melons to a considerable extent in Bedford County, Pa. (642)

1967. Coop. Econ. Insect Rep. 17:139, 211.
*Euxoa messoria* caused severe injury to several corn fields in southwestern Pennsylvania. (139) The dark-sided cutworm damaged melons in Bedford County, Pa. (211)

1968. Coop. Econ. Insect Rep. 18:109, 486, 521, 734.
*Euxoa messoria* moderately damaged field corn in Warren County, N. J., during early June. (109) *Euxoa messoria* damaged corn in Antelope County, Neb. (486) The dark-sided cutworm was responsible for the loss of 8 acres of asparagus in Berrien County, Mich. (521) On July 22, *Euxoa messoria* moths were increasing in numbers at all Michigan stations. (734)

1969. Coop. Econ. Insect Rep. 19:133, 186.
*Euxoa messoria* larvae damaged corn seedlings in two northeastern counties of Nebraska. (133) *Euxoa messoria* was more active than usual on asparagus in Michigan. The larvae destroyed about 6 acres of this crop in Berrien County. (186)

1970. Coop. Econ. Insect Rep. 20:350, 400.
*Euxoa messoria* caused severe damage to seedling corn in Dodge, Washington, Platte, Polk, Colfax, Dawson, Clay, Saline, Seward, and York counties in Nebraska. (350) *Euxoa messoria* larvae damaged corn in the eastern third of Nebraska. (400)

1971. Coop. Econ. Insect Rep. 21:147.
The dark-sided cutworm, *Euxoa messoria*, damaged corn in Dodge, Washington, Platte, Polk, Colfax, Dawson, Clay, Saline, Seward, and York counties in Nebraska. (147)

1973. Coop. Econ. Insect Rep. 23:341.
*Euxoa messoria* was present in sugar beet fields in Norman and Clay counties in Minnesota. (341)

Walkden, H. H. 1943. Cutworm and armyworm populations in pasture grasses, waste lands, and forage crops. J. Econ. Entomol. 36(3):376-381.
Only a small percentage of 4,687 specimens of cutworms taken from sack traps in Kansas were *Euxoa messoria*.

Walkden, H. H. 1950. Cutworms, armyworms, and related species attacking cereal and forage crops in the central Great Plains. U. S. Dep. Agr. Circ. 849:1-52.
This publication contains a key to ultimate instar larvae of common cutworms and armyworms. It also describes the geographical distribution, economic status, food plants, seasonal history, and natural enemies of the dark-sided cutworm. (32)

Walker, F. 1865. List of the specimens of lepidopterous insects in the collection of the British Museum. Part 32.:658, 660, 691, 692.
Walker described *Euxoa messoria* as a new species, *Mamestra inextricata*. His description is in both Latin and English. (658) Walker described *Euxoa messoria* as a new species, *Mamestra indirecta*. (659) Walker described *Euxoa messoria* as a new species, *Mamestra displiciens*. (660) Walker described *Euxoa messoria* as a new species, *Mamestra expulsa*. (661) Walker described *Euxoa messoria* as a new species, *Agrotis ordinata*. (691) Walker described *Euxoa messoria* as a new species, *Agrotis reticens*. (692)

Whelan, D. B. 1935. A key to the Nebraska cutworms and armyworms that attack corn. Nebraska Agr. Exp. Sta. Res. Bull. 81:1-27. In addition to the key, a larval description, distribution, seasonal abundance, habits, and food plants of the dark-sided cutworm are given. (13-14)

Young, C. H. 1903. Report on insects of the year. Annu. Rep. Entomol. Soc. Ontario 34:18-19.
The author reports cutworms were abundant in May and June, 1903, and caused serious damage to cabbages and other plants when first set out. The most abundant species was the dark-sided cutworm, *Carneades* (*Euxoa*) *messoria*. (18)

Young, C. H. 1905. Reports on insects of the year. Division No. 1, Ottawa district. Entomol. Soc. Ontario 35:3-4.
"Of injurious insects, the most serious outbreak was that of two kinds of cutworms, viz. the red-backed cutworm (*Paragrotis ochrogaster*) and the dark-sided cutworm (*Paragrotis messoria*). The former of these was the most abundant and did considerable damage." (4)

Young, C. H. 1906. The principal injurious insects of 1906. U. S. Dep. Agr. Yearbook:508-517.
Two cutworms (*Carneades tesellata* Harris and *C. punctigera* Walker) attacked oats in North Dakota, while a third (*C.* (=*Euxoa*) *messoria* Harris) attacked corn, and a fourth (*Hadena devastatrix* Brace) attacked young growing wheat. (510)

# Index

This index was prepared on the computer from keywords indicated on the index card file. Information may be retrieved by author's name (left-hand column) and year (right-hand column); by host plant, by geographical locality, and by subject, *i.e.*, larval description, life history, outbreak, geographical distribution, etc. The Canadian Insect Pest Review is abbreviated as CIPR, the Insect Pest Survey as IPS, and the Cooperative Economic Insect Report as CEIR.

BRITISH-COLUMBIA ONTARIO* CIPR. TOBACCO 04406 1961
BRITISH-COLUMBIA GEOGRAPHICAL-DISTRIBUTI 15106 1927
BRITISH-COLUMBIA NOVA-SCOTIA ONTARIO* C 04306 1960
BRITISH-COLUMBIA* CIPR. VEGETABLE-GARDE 04106 1958
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BRITISH-COLUMBIA* BLACKMORE. OUTBREAK B 01006 1918
BUCHER. BACILLUS-THURINGIENSIS FEEDING-I 01306 1966
BUCHER. PATHOGENS TARICHIUM-MEGASPERMUM* 01906 1974
BUCHER. TOBACCO ONTARIO* BUCHER. TOBACC 01406 1969
BUCHER. TOBACCO ONTARIO* BUCHER. TOBACC 01506 1970
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BUCHER. TOBACCO ONTARIO TRAP-PLANTS* BU 01706 1970
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CABBAGE POISON-BAITS HOST-RANGE* GIBSON 10406 1917
CABBAGE* SMITH. NEW-JERSEY ONIONS CABBA 17906 1892
CABBAGE* YOUNG. ONTARIO CABBAGE* YOUNG 22606 1903
CABBAGE* SPECHT. TOBACCO POISON-BAITS C 18806 1973
CALIFORNIA* ESSIG. HOST-RANGE CALIFORNI 08206 1926
CALIFORNIA* LANGE. ASPARAGUS CALIFORNIA 14806 1958
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CANADA LARVAL-ILLUSTRATION* GIBSON. LIF 09906 1912
CANADA LIFE-HISTORY* GIBSON. CANADA LIF 10206 1915
CANADA PATHOGENS* HEWITT. CANADA PATHOG 13706 1915
CANADA VEGETABLES* GIBSON. CANADA VEGET 10306 1916
CANADA VEGETABLES* GIBSON. CANADA VEGET 10106 1915
CANADA VEGETABLES* GIBSON. CANADA VEGET 10506 1917
CANADA* HEWITT. HOST-RANGE CANADA* HEW 13806 1917
CARROTS* CIPR. ONTARIO VEGETABLE-GARDEN 02706 1936
CASE. CLIMBING-CUTWORMS LARVAL-ILLUSTRAT 05206 1881
CATALOGUE* SMITH. SYNONYM CATALOGUE* S 18406 1904
CATALOGUE* SMITH. SYNONYMS CATALOGUE* 18606 1907
CEIR. ALFALFA NEW-HAMPSHIRE* CEIR. ALFA 21406 1965
CEIR. ALFALFA NEBRASKA* CEIR. ALFALFA N 21306 1964
CEIR. CORN NEBRASKA SUGAR-BEET TOBACCO* 21106 1962
CEIR. CORN NEBRASKA* CEIR. CORN NEBRASK 22006 1971
CEIR. CORN NEBRASKA* CEIR. CORN NEBRASK 21906 1970
CEIR. MELONS PENNSYLVANIA CORN* CEIR. M 21606 1967
CEIR. MICHIGAN NEBRASKA NEW-JERSEY ASPAR 21706 1968
CEIR. MICHIGAN NEBRASKA ASPARAGUS CORN* 21806 1969
CEIR. MINNESOTA SUGAR-BEETS* CEIR. MINN 22106 1973
CEIR. MINNESOTA FLAX* CEIR. MINNESOTA F 20806 1953
CEIR. NEBRASKA SUGAR-BEETS CORN ALFALFA* 21006 1961
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CHECK-LIST SYNONYM* DOD. CHECK-LIST SYN 07906 1918
CHECK-LIST SYNONYMS* MCDUNNOUGH. CHECK- 15206 1938
CHECKLIST* BEUTENMULLER. NEW-YORK HOST- 00906 1901
CHEMICAL-CONTROL* HARRIS. SOIL-INSECTIC 23506 1972

CIPR. TOBACCO ONTARIO NOVA-SCOTIA LARVAL 05106 1971
CIPR. VEGETABLE-GARDENS FLOWER-GARDENS B 04106 1958
CLIMBING-BEHAVIOR MOTH-ILLUSTRATION* RI 16506 1869
CLIMBING-BEHAVIOR* RILEY. FEEDING-BEHAV 16906 1884
CLIMBING-BEHAVIOR ONTARIO FRUIT-TREES EC 01106 1880
CLIMBING-BEHAVIOR* SAUNDERS. CLIMBING-B 17206 1883
CLIMBING-BEHAVIOR* FROST. PENNSYLVANIA 09706 1955
CLIMBING-BEHAVIOR* PERKINS. VERMONT CLI 16206 1894
CLIMBING-BEHAVIOR* SMITH. ONIONS CLIMBI 18106 1895
CLIMBING-BEHAVIOR* SAUNDERS. CLIMBING-B 17306 1904
CLIMBING-CUTWORMS* SLINGERLAND. CLIMBIN 17606 1915
CLIMBING-CUTWORMS HOST-RANGE LARVAL-ILLU 07506 1932
CLIMBING-CUTWORMS LARVAL-ILLUSTRATION* 05206 1881
CLOVER ALFALFA BEETS CARROTS* CIPR. ONT 02706 1936
CONNECTICUT* ANDERSON. TOBACCO-SEED-BED 00206 1950
CONNECTICUT NEBRASKA* IPS. CONNECTICUT 20506 1938
CONNECTICUT POISON-BAITS* MORRILL. TOBA 15806 1942
CONNECTICUT POISON-BAIT* MORRILL. TOBAC 15706 1938
CONNECTICUT* LACROIX. TOBACCO CONNECTIC 14606 1935
CONNECTICUT OUTBREAK ECONOMIC-IMPORTANCE 17006 1885
CONTROL-MEASURES MOTH-ILLUSTRATION LARVA 00806 1888
COOK. LARVAL-ILLUSTRATION* COOK. LARVAL 06506 1875
COOK. LIGHT-TRAPS MIGRANT-MOTHS TRAP-HEI 06706 1930
COOK. MINNESOTA VEGETABLES ONIONS FIELD- 06906 1934
COOK. MINNESOTA LARVAL-KEY FIELD-KEY* C 06606 1920
COOK. MONTANA FAUNAL-LIST HOST-RANGE* C 06806 1930
COOLEY. ABNORMAL-ABUNDANCE* COOLEY. ABN 07006 1928
CORN ALFALFA* CEIR. NEBRASKA SUGAR-BEET 21006 1961
CORN ALFALFA TOBACCO* CEIR. ONTARIO NEB 21206 1963
CORN GRAIN-CROPS VEGETABLE-GARDENS FLOWE 02506 1933
CORN ILLINOIS* FORBES. CORN ILLINOIS* 09306 1905
CORN ILLINOIS LARVAL-DESCRIPTION* FORBE 09206 1904
CORN NEBRASKA LARVAL-KEY HOST-RANGE* WH 22506 1935
CORN NEBRASKA* CEIR. CORN NEBRASKA* CE 22006 1971
CORN NEBRASKA* CEIR. CORN NEBRASKA* CE 21906 1970
CORN NEBRASKA SUGAR-BEET TOBACCO* CEIR. 21106 1962
CORN NORTH-DAKOTA* YOUNG. CORN NORTH-DA 22806 1906
CORN ONTARIO* CIPR. TOBACCO STRAWBERRY 04806 1965
CORN VEGETABLE-GARDENS* CIPR. ALFALFA N 02406 1932
CORN VEGETABLE-GARDENS OUTBREAK ONTARIO* 04606 1963
CORN* CEIR. MELONS PENNSYLVANIA CORN* 21606 1967
CORN* CEIR. MICHIGAN NEBRASKA ASPARAGUS 21806 1969
CORN* CEIR. MICHIGAN NEBRASKA NEW-JERSE 21706 1968
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CORN* IPS. NEBRASKA CORN* IPS. NEBRASK 19706 1925
COTYPE SYNONYM* RINDGE. COTYPE SYNONYM* 17106 1955
CROP-DAMAGE* FLETCHER. ONTARIO CROP-DAM 09106 1905
CROSBY. HOST-RANGE LARVAL-DESCRIPTION* 07106 1918
CRUCIFERS QUEBEC* CIPR. POTATOES CRUCIF 02106 1925
CRUMB. CLIMBING-CUTWORMS HOST-RANGE LARV 07506 1932
CRUMB. TOBACCO HOST-RANGE SEASONAL-DISTR 07306 1926
CRUMB. TOBACCO EGG-KEY LARVAL-KEY PUPAL- 07406 1929
CRUMB. TOBACCO LARVAL-KEY* CRUMB. TOBAC 07206 1915
CYCLODIENE-TOLERANCE* CIPR. TOBACCO ONT 04706 1964
DAVIS. UTAH LIGHT-TRAPS* DAVIS. UTAH LI 07606 1937
DIRKS. MAINE HOST-RANGE DISTRIBUTION* D 23606 1937

DISTRIBUTION* MOORE. MICHIGAN FAUNAL-LI 23906 1955
DISTRIBUTION* DIRKS. MAINE HOST-RANGE D 23606 1937
DOANE. SUGAR-BEET FEEDING-BEHAVIOR* DOA 07706 1900
DOD. ALBERTA SYNONYMS FAUNAL-LIST* DOD. 07806 1905
DOD. CHECK-LIST SYNONYM* DOD. CHECK-LIS 07906 1918
DYAR. FAUNAL-LIST SYNONYM* DYAR. FAUNAL 08106 1904
DYAR. FAUNAL-LIST SYNONYMS* DYAR. FAUNA 08006 1902
ECONOMIC-IMPORTANCE* CHITTENDEN. NEW-YO 06306 1907
ECONOMIC-IMPORTANCE ONTARIO* CHENG. TOB 05606 1971
ECONOMIC-IMPORTANCE* CIPR. ONTARIO ECON 03906 1956
ECONOMIC-IMPORTANCE SEASONAL-HISTORY* K 14506 1944
ECONOMIC-IMPORTANCE* CIPR. ONION-SEEDLI 03506 1950
ECONOMIC-IMPORTANCE ONION* RILEY. CONNE 17006 1885
ECONOMIC-IMPORTANCE* CIPR. TOBACCO ONTA 03406 1949
ECONOMIC-IMPORTANCE* SMITH. NEW-JERSEY 18206 1899
ECONOMIC-IMPORTANCE PATHOGENS PARASITES* 22306 1950
ECONOMIC-IMPORTANCE* BOWLES. CLIMBING-B 01106 1880
ECONOMIC-IMPORTANCE* CHITTENDEN. ONION 06406 1912
EGG-KEY LARVAL-KEY PUPAL-KEY TENNESEE* 07406 1929
ENTOMOPHTHORA-SP. PARASITES* CIPR. TOBA 04506 1962
ESSIG. HOST-RANGE CALIFORNIA* ESSIG. HO 08206 1926
EUXOA-DECLARATA-DECOLOR STRAWBERRY-PLANT 03606 1951
EUXOA-DETERSA* CIPR. TOBACCO ONTARIO EU 03206 1944
EUXOA-OCHROGASTER ECONOMIC-IMPORTANCE* 03506 1950
EUXOA-TESSELATA EUXOA-DETERSA* CIPR. TO 03206 1944
FAUNAL-LIST SYNONYM* DYAR. FAUNAL-LIST 08106 1904
FAUNAL-LIST* HAMPSON. SYNONOMY FAUNAL-L 11906 1903
FAUNAL-LIST* GROTE. FAUNAL-LIST* GROTE 11506 1882
FAUNAL-LIST* GROTE. CALIFORNIA FAUNAL-L 11206 1874
FAUNAL-LIST GEOGRAPHICAL-DISTRIBUTION* 08706 1954
FAUNAL-LIST MOTH-KEY* GROTE. FAUNAL-LIS 11106 1874
FAUNAL-LIST* FICHT. INDIANA FAUNAL-LIST 08806 1940
FAUNAL-LIST SYNONYM* GROTE. FAUNAL-LIST 11006 1873
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FAUNAL-LIST* DOD. ALBERTA SYNONYMS FAUN 07806 1905
FAUNAL-LIST DISTRIBUTION* MOORE. MICHIG 23906 1955
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FAUNAL-LIST HOST-RANGE* COOK. MONTANA F 06806 1930
FAUNAL-LIST MOTH-KEY MOTH-DESCRIPTION* 09406 1954
FEEDING-BEHAVIOR CLIMBING-BEHAVIOR* RIL 16906 1884
FEEDING-BEHAVIOR* MITCHENER. TEMPERATUR 15606 1928
FEEDING-BEHAVIOR NEW-JERSEY* SMITH. SWE 18706 1910
FEEDING-BEHAVIOR* DOANE. SUGAR-BEET FEE 07706 1900
FEEDING-HABITS* RILEY. ONION FEEDING-HA 23706 1886
FEEDING-INHIBITION* BUCHER. BACILLUS-TH 01306 1966
FELT. HOST-RANGE NEW-YORK* FELT. HOST-R 08306 1904
FELT. NEW-YORK HOST-RANGE* FELT. NEW-YO 08406 1905
FELT. NEW-YORK PRIMROSE* FELT. NEW-YORK 08506 1907
FELT. NEW-YORK* FELT. NEW-YORK* FELT. 08606 1907
FERGUSON. NOVA-SCOTIA FAUNAL-LIST GEOGRA 08706 1954
FICHT. INDIANA FAUNAL-LIST* FICHT. INDI 08806 1940
FIELD-CROPS* COOK. MINNESOTA VEGETABLES 06906 1934
FIELD-KEY* COOK. MINNESOTA LARVAL-KEY F 06606 1920
FLAX* CEIR. MINNESOTA FLAX* CEIR. MINN 20806 1953
FLETCHER. ONTARIO CROP-DAMAGE* FLETCHER 09106 1905
FLETCHER. SYNONYM* FLETCHER. SYNONYM* 08906 1888

FLETCHER. SYNONYM LARVAL-DESCRIPTION* F 09006 1893
FLIGHT-PERIOD* IPS. MAINE FLIGHT-PERIOD 20706 1941
FLOWER-GARDENS BRITISH-COLUMBIA* CIPR. 04106 1958
FLOWERS ONTARIO* CIPR. CORN GRAIN-CROPS 02506 1933
FORAGE-CROPS MASSACHUSETTS* SHAW. FORAG 17506 1959
FORBES. CORN ILLINOIS* FORBES. CORN ILL 09306 1905
FORBES. CORN ILLINOIS LARVAL-DESCRIPTION 09206 1904
FORBES. FAUNAL-LIST MOTH-KEY MOTH-DESCRI 09406 1954
FRENCH. LARVAL-DESCRIPTION LARVAL-ILLUST 09506 1878
FRENCH. SYNONYM* FRENCH. SYNONYM* FREN 09606 1878
FROST. PENNSYLVANIA LARVAL-KEY CLIMBING- 09706 1955
FRUIT-TREES ECONOMIC-IMPORTANCE* BOWLES 01106 1880
GARMAN. KENTUCKY POISON-BAITS* GARMAN. 09806 1892
GENETALIC-CHARACHTERS HOLOTYPES SYNONYMS 15406 1950
GENETALIC-DESCRIPTION* HARDWICK. SYNONO 12006 1970
GEOGRAPHICAL-DISTRIBUTION HOST-RANGE* T 19106 1951
GEOGRAPHICAL-DISTRUBUTION* SMITH. SYNON 17706 1890
GEOGRAPHICAL-DISTRIBUTION* SCHAFFNER. P 17406 1934
GEOGRAPHICAL-DISTRIBUTION* MCDUNNOUGH. 15106 1927
GEOGRAPHICAL-DISTRIBUTION* BRIMLEY. NOR 01206 1938
GEOGRAPHICAL-DISTRIBUTION MAP-DISTRIBUTI 04206 1959
GEOGRAPHICAL-DISTRIBUTION* FERGUSON. NO 08706 1954
GEORAPHICAL-DISTRIBUTION GENETALIC-DESCR 12006 1970
GIBSON. CANADA VEGETABLES* GIBSON. CANA 10106 1915
GIBSON. CANADA HOST-RANGE SOIL-TYPE* GI 10006 1913
GIBSON. CANADA VEGETABLES* GIBSON. CANA 10306 1916
GIBSON. CABBAGE POISON-BAITS HOST-RANGE* 10406 1917
GIBSON. CANADA VEGETABLES* GIBSON. CANA 10506 1917
GIBSON. CANADA LIFE-HISTORY* GIBSON. CA 10206 1915
GIBSON. LIFE-HISTORY CANADA LARVAL-ILLUS 09906 1912
GIBSON. PATHOGENS CANADA BRITISH-COLUMBI 10606 1923
GILLETTE. IOWA HOST-RANGE* GILLETTE. IO 10706 1891
GOSSARD. OHIO OUTBREAK ONION MICHIGAN IN 10806 1914
GOSSARD. OHIO LARVAL-DESCRIPTION* GOSSA 10906 1917
GRAIN-CROPS VEGETABLE-GARDENS FLOWERS ON 02506 1933
GROTE. CALIFORNIA SYNONYM MOTH-DESCRIPTI 23206 1878
GROTE. CALIFORNIA FAUNAL-LIST* GROTE. C 11206 1874
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GUENEE. SYNONYM* GUENEE. SYNONYM* GUEN 11706 1852
GUI. OHIO OUTBREAK* GUI. OHIO OUTBREAK* 11806 1936
HAMPSON. SYNONOMY FAUNAL-LIST* HAMPSON. 11906 1903
HARDWICK. SYNONOMY GEORAPHICAL-DISTRIBUT 12006 1970
HARRIS. CHEMICAL-CONTROL* HARRIS. CHEMI 12806 1971
HARRIS. CHEMICAL-CONTROL* HARRIS. CHEMI 12706 1971
HARRIS. CHEMICAL-CONTROL* HARRIS. CHEMI 12606 1970
HARRIS. CHEMICAL-CONTROL INSECTIDAL-RESI 12106 1962
HARRIS. CHEMICAL-CONTROL* HARRIS. CHEMI 12206 1968
HARRIS. CHEMICAL-CONTROL SOIL-INSECTICID 12306 1968
HARRIS. CHEMICAL-CONTROL* HARRIS. CHEMI 12406 1969

IPS. CONNECTICUT NEBRASKA* IPS. CONNECT 20506 1938
IPS. MAINE FLIGHT-PERIOD* IPS. MAINE FL 20706 1941
IPS. MASSACHUSETTS STRAWBERRY* IPS. MAS 20106 1931
IPS. MINNESOTA IOWA SOUTH-DAKOTA* IPS. 19906 1929
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IPS. OKLAHOMA WHEAT BARLEY* IPS. OKLAHO 20606 1940
IPS. OREGON STRAWBERRY* IPS. OREGON STR 20006 1930
IPS. POTATO TOMATO NEBRASKA* IPS. POTAT 20406 1936
KANSAS LARVAL-SAMPLING SACK-TRAPS* WALK 22206 1943
KENTUCKY POISON-BAITS* GARMAN. KENTUCKY 09806 1892
KING. SASKATCHEWAN MANITOBA* KING. SASK 14306 1929
KNOWLTON. UTAH* KNOWLTON. UTAH* KNOWLT 14406 1974
KNUTSON. MINNESOTA ECONOMIC-IMPORTANCE S 14506 1944
LACROIX. TOBACCO CONNECTICUT* LACROIX. 14606 1935
LANGE. ARTICHOKE-GLOBE* LANGE. ARTICHOK 14706 1941
LANGE. ASPARAGUS CALIFORNIA* LANGE. ASP 14806 1958
LARVAL-DESCRIPTION* FLETCHER. SYNONYM L 09006 1893
LARVAL-DESCRIPTION LARVAL-ILLUSTRATION* 16406 1867
LARVAL-DESCRIPTION OVIPOSITION* CHAMBER 05306 1957
LARVAL-DESCRIPTION* CROSBY. HOST-RANGE 07106 1918
LARVAL-DESCRIPTION LARVAL-ILLUSTRATION* 09506 1878
LARVAL-DESCRIPTION* LOCHHEAD. LARVAL-DE 15006 1919
LARVAL-DESCRIPTION* FORBES. CORN ILLINO 09206 1904
LARVAL-DESCRIPTION* GOSSARD. OHIO LARVA 10906 1917
LARVAL-DESCRIPTION CHECKLIST* BEUTENMUL 00906 1901
LARVAL-ILLUSTRATION* CRUMB. CLIMBING-CU 07506 1932
LARVAL-ILLUSTRATION* PACKARD. LARVAL-IL 16006 1869
LARVAL-ILLUSTRATION* FRENCH. LARVAL-DES 09506 1878
LARVAL-ILLUSTRATION* RILEY. LARVAL-DESC 16406 1867
LARVAL-ILLUSTRATION* COOK. LARVAL-ILLUS 06506 1875
LARVAL-ILLUSTRATION SYNONOMY* RILEY. LA 16806 1883
LARVAL-ILLUSTRATION* CASE. CLIMBING-CUT 05206 1881
LARVAL-ILLUSTRATION* GIBSON. LIFE-HISTO 09906 1912
LARVAL-ILLUSTRATION* LINTNER. NEW-YORK 14906 1888
LARVAL-ILLUSTRATION* BETHUNE. CONTROL-M 00806 1888
LARVAL-INSTARS HIBERNATION LIFE-HISTORY 06006 1973
LARVAL-KEY CLIMBING-BEHAVIOR* FROST. PE 09706 1955
LARVAL-KEY PUPAL-KEY TENNESEE* CRUMB. T 07406 1929
LARVAL-KEY* CRUMB. TOBACCO LARVAL-KEY* 07206 1915
LARVAL-KEY FIELD-KEY* COOK. MINNESOTA L 06606 1920
LARVAL-KEY HOST-RANGE* WHELAN. CORN NEB 22506 1935
LARVAL-KEYS HOST-RANGE ECONOMIC-IMPORTAN 22306 1950
LARVAL-MORTALITY* BUCHER. TOBACCO ONTAR 01806 1971
LARVAL-POPULATIONS* CIPR. TOBACCO ONTAR 05106 1971
LARVAL-SAMPLING SACK-TRAPS* WALKDEN. KA 22206 1943
LARVAL-SEX-DETERMINATION* HINKS. SEX-DE 13906 1973
LECTOTYPES* TODD. SYNONYM LECTOTYPES* 19306 1968
LEONARD. NEW-YORK IDENTIFICATION* LEONA 24006 1928
LETTUCE PEAS RADISH TOMATOES* CIPR. ONT 02806 1937
LIFE-HISTORY NATURAL-MORTALITY* CHENG. 06006 1973
LIFE-HISTORY* GIBSON. CANADA LIFE-HISTO 10206 1915
LIFE-HISTORY CANADA LARVAL-ILLUSTRATION* 09906 1912
LIGHT-TRAPS* DAVIS. UTAH LIGHT-TRAPS* 07606 1937
LIGHT-TRAPS MIGRANT-MOTHS TRAP-HEIGHT* 06706 1930

SCHAFFNER. PARASITES GEOGRAPHICAL-DISTRI 17406 1934
SEASONAL-DISTRIBUTION* CRUMB. TOBACCO H 07306 1926
SEASONAL-HISTORY* KNUTSON. MINNESOTA EC 14506 1944
SEASONAL-HISTORY* METCALF. SEASONAL-HIS 15506 1962
SEX-DETERMINATION-LARVAL LARVAL-SEX-DETE 13906 1973
SEXING-PUPAE PUPAL-SEXING* CHENG. SEXIN 05506 1970
SHAW. FORAGE-CROPS MASSACHUSETTS* SHAW. 17506 1959
SLINGERLAND. CLIMBING-CUTWORMS* SLINGER 17606 1915
SMITH. NEW-JERSEY SWEET-POTATOES ECONOMI 18206 1899
SMITH. NEW-JERSEY ONIONS CABBAGE* SMITH 17906 1892
SMITH. ONIONS CLIMBING-BEHAVIOR* SMITH. 18106 1895
SMITH. SWEET-POTATO FEEDING-BEHAVIOR NEW 18706 1910
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SMITH. SYNONYMS FAUNAL-LIST* SMITH. SYN 18006 1893
SOIL-INSECTICIDES* HARRIS. CHEMICAL-CON 12306 1968
SOIL-INSECTICIDES BRITISH-COLUMBIA* BAN 00606 1960
SOIL-INSECTICIDES CHEMICAL-CONTROL* HAR 23506 1972
SOIL-TYPE* GIBSON. CANADA HOST-RANGE SO 10006 1913
SOROSPORELLA-UVELLA BEAUVERIA-GLOBULIFER 04506 1962
SOUTH-DAKOTA* IPS. MINNESOTA IOWA SOUTH 19906 1929
SPECHT. CHEMICAL-CONTROL TOBACCO* SPECH 18906 1973
SPECHT. TOBACCO POISON-BAITS CABBAGE* S 18806 1973
SPRUCE-SEEDLINGS GEOGRAPHICAL-DISTRIBUTI 04206 1959
SPRUCE-SEEDLINGS LIGHT-TRAPS BRITISH-COL 04306 1960
STRAWBERRY VEGETABLE-GARDENS* CIPR. ONT 04006 1957
STRAWBERRY-PLANTATION SAWDUST-MULCH NEW- 03706 1952
STRAWBERRY-PLANTING* CIPR. AGROTIS-IPSI 03606 1951
STRAWBERRY* IPS. OREGON STRAWBERRY* IP 20006 1930
STRAWBERRY* IPS. MASSACHUSETTS STRAWBER 20106 1931
STRAWBERRY OUTBREAKS CORN ONTARIO* CIPR 04806 1965
STRAWBERRY TOBACCO WEEDSCORN MELONS* CE 21506 1966
SUGAR-BEET FEEDING-BEHAVIOR* DOANE. SUG 07706 1900
SUGAR-BEET TOBACCO* CEIR. CORN NEBRASKA 21106 1962
SUGAR-BEETS CORN ALFALFA* CEIR. NEBRASK 21006 1961
SUGAR-BEETS* CEIR. MINNESOTA SUGAR-BEET 22106 1973
SWEET-POTATO FEEDING-BEHAVIOR NEW-JERSEY 18706 1910
SWEET-POTATOES POISON-BAITS* APGAR. NEW 00406 1910
SWEET-POTATOES MARYLAND* SYMONS. POTATO 19006 1905
SWEET-POTATOES ECONOMIC-IMPORTANCE* SMI 18206 1899
SYMONS. POTATOES SWEET-POTATOES MARYLAND 19006 1905
SYNONOMY FAUNAL-LIST* HAMPSON. SYNONOMY 11906 1903
SYNONOMY GEORAPHICAL-DISTRIBUTION GENETA 12006 1970
SYNONOMY HOST-RANGE* TIETZ. SYNONOMY HO 19206 1972
SYNONOMY* BUTLER. SYNONOMY* BUTLER. SY 02006 1889
SYNONOMY* RILEY. LARVAL-ILLUSTRATION SY 16806 1883
SYNONYM CATALOGUE* SMITH. SYNONYM CATAL 18406 1904
SYNONYM LARVAL-DESCRIPTION* FLETCHER. S 09006 1893
SYNONYM LECTOTYPES* TODD. SYNONYM LECTO 19306 1968
SYNONYM MOTH-DESCRIPTION* GROTE. CALIFO 23206 1878
SYNONYM* SMITH. SYNONYM* SMITH. SYNONY 18506 1906
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SYNONYMS FAUNAL-LIST* SMITH. SYNONYMS F 18006 1893
SYNONYMS FAUNAL-LIST* DOD. ALBERTA SYNO 07806 1905
SYNONYMS GEOGRAPHICAL-DISTRUBUTION* SMI 17706 1890
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SYNONYMS* BARNES. CHECK-LIST SYNONYMS* 22906 1917
SYNONYMS* HOLLAND. MOTH-ILLUSTRATION SY 14006 1968
SYNONYMS* DYAR. FAUNAL-LIST SYNONYMS* 08006 1902
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SYNONYMS* RILEY. SYNONYMS* RILEY. SYNO 16606 1881
SYNONYMS* MCDUNNOUGH. GENETALIC-CHARACH 15406 1950
SYNONYMS* MCDUNNOUGH. CHECK-LIST SYNONY 15206 1938
TARICHIUM-MEGASPERMUM* BUCHER. PATHOGEN 01906 1974
TARSAL-CLAWS* HAWKINS. TARSAL-CLAWS* H 13506 1930
TEMPERATURE-EFFECTS FEEDING-BEHAVIOR* M 15606 1928
TENNESEE* CRUMB. TOBACCO EGG-KEY LARVAL 07406 1929
TIETZ. PENNSYLVANIA GEOGRAPHICAL-DISTRIB 19106 1951
TIETZ. SYNONOMY HOST-RANGE* TIETZ. SYNO 19206 1972
TOBACCO BIOLOGICAL-CONTROL* CHENG. BACI 06106 1973
TOBACCO CORN VEGETABLE-GARDENS OUTBREAK 04606 1963
TOBACCO CONNECTICUT* LACROIX. TOBACCO C 14606 1935
TOBACCO CONNECTICUT POISON-BAITS* MORRI 15806 1942
TOBACCO CONNECTICUT POISON-BAIT* MORRIL 15706 1938
TOBACCO ECONOMIC-IMPORTANCE ONTARIO* CH 05606 1971
TOBACCO EGG-KEY LARVAL-KEY PUPAL-KEY TEN 07406 1929
TOBACCO EUXOA-DECLARATA-DECOLOR STRAWBER 03606 1951
TOBACCO HOST-RANGE SEASONAL-DISTRIBUTION 07306 1926
TOBACCO LARVAL-DESCRIPTION OVIPOSITION* 05306 1957
TOBACCO LARVAL-KEY* CRUMB. TOBACCO LARV 07206 1915
TOBACCO LIGHT-TRAPS BRITISH-COLUMBIA ONT 04406 1961
TOBACCO ONTARIO RYE HOST-RANGE* BEIRNE. 23006 1971
TOBACCO ONTARIO CHEMICAL-CONTROL* CHENG 06206 1973
TOBACCO ONTARIO* ARNOTT. TOBACCO ONTARI 00506 1943
TOBACCO ONTARIO CHEMICAL-CONTROL* CHENG 05906 1972
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TOBACCO ONTARIO NOVA-SCOTIA LARVAL-POPUL 05106 1971
TOBACCO ONTARIO* CIPR. TOBACCO ONTARIO* 05006 1970
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TOBACCO ONTARIO* BUCHER. TOBACCO ONTARI 01506 1970
TOBACCO ONTARIO CYCLODIENE-TOLERANCE* C 04706 1964

TOBACCO ONTARIO* BUCHER. TOBACCO ONTARI 01606 1970
TOBACCO ONTARIO TRAP-PLANTS* BUCHER. TO 01706 1970
TOBACCO ONTARIO EUXOA-OCHROGASTER ECONOM 03506 1950
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TOBACCO STRAWBERRY OUTBREAKS CORN ONTARI 04806 1965
TOBACCO STRAWBERRY VEGETABLE-GARDENS* C 04006 1957
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TOBACCO* CEIR. ONTARIO NEBRASKA CORN AL 21206 1963
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TOBACCO-SEED-BEDS CONNECTICUT* ANDERSON 00206 1950
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TOMATOES* CIPR. ONTARIO HELENIUM LETTUC 02806 1937
TRAP-HEIGHT* COOK. LIGHT-TRAPS MIGRANT- 06706 1930
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